the OIL AND GAS JOURNAL

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TEXAS TECHNOLOGICAL
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YOU'VE GOT TO KNOW
ALL THE ANGLES
to get a profitable curve

TRET·O·LITE

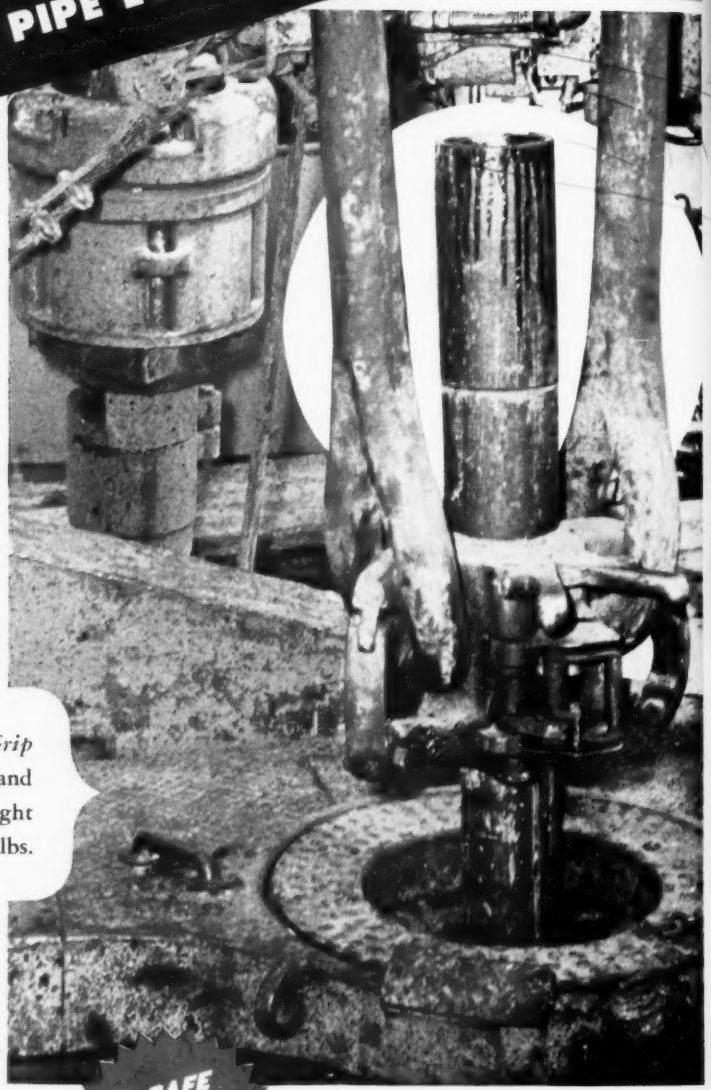
Knowing all the angles on effective dehydration is a Tretolite specialty. Tretolite's knowledge of answers to difficult dehydration problems is the natural result of years of dehydrating activity. When you need effective dehydrating assistance, remember:

- TRETOLITE PIONEERED IN CHEMICAL DEHYDRATION
- MORE TRETOLITE IS USED, AND HAS BEEN FOR YEARS, THAN ANY OTHER DEHYDRATING REAGENT
- TRETOLITE IS THE LEADER IN QUALITY, SERVICE, KNOW-HOW

TRETOLITE COMPANY
Manufacturing Chemists
ST. LOUIS 19, MISSOURI • LOS ANGELES 22, CALIFORNIA
DEHYDRATING | DESALTING

TC-48-4

This REED *Super Shrink Grip* TOOL JOINT BOX IS HOLDING THE HEAVIEST STRING OF DRILL PIPE EVER USED

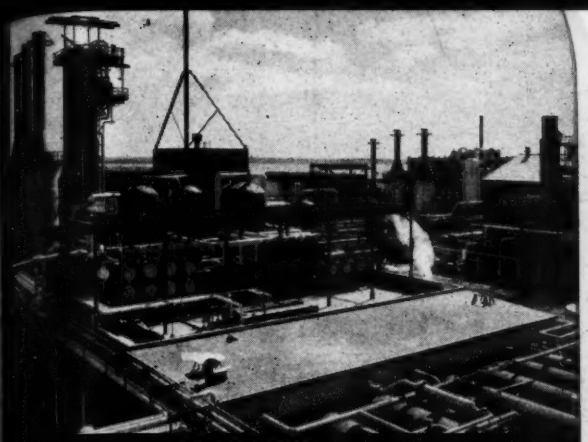


This string of 507 Reed *Super Shrink-Grip* Tool Joints on 19.5 pound, 5" O.D. pipe and 12 Reed Drill Collars represents a dead weight (less flotation) of approximately 377,600 lbs.

BE SAFE WITH REED

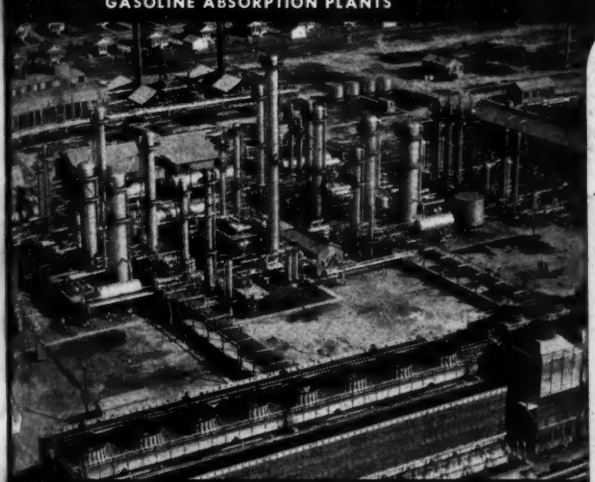
Reed ROLLER BIT COMPANY

HOUSTON 1, TEXAS

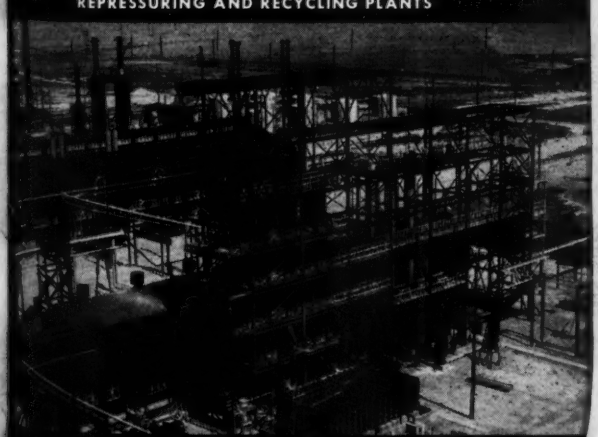


OIL REFINERIES

GASOLINE ABSORPTION PLANTS



REPRESSURING AND RECYCLING PLANTS



PETRO-CHEMICAL PLANTS

GHQ for Refinery Supplies

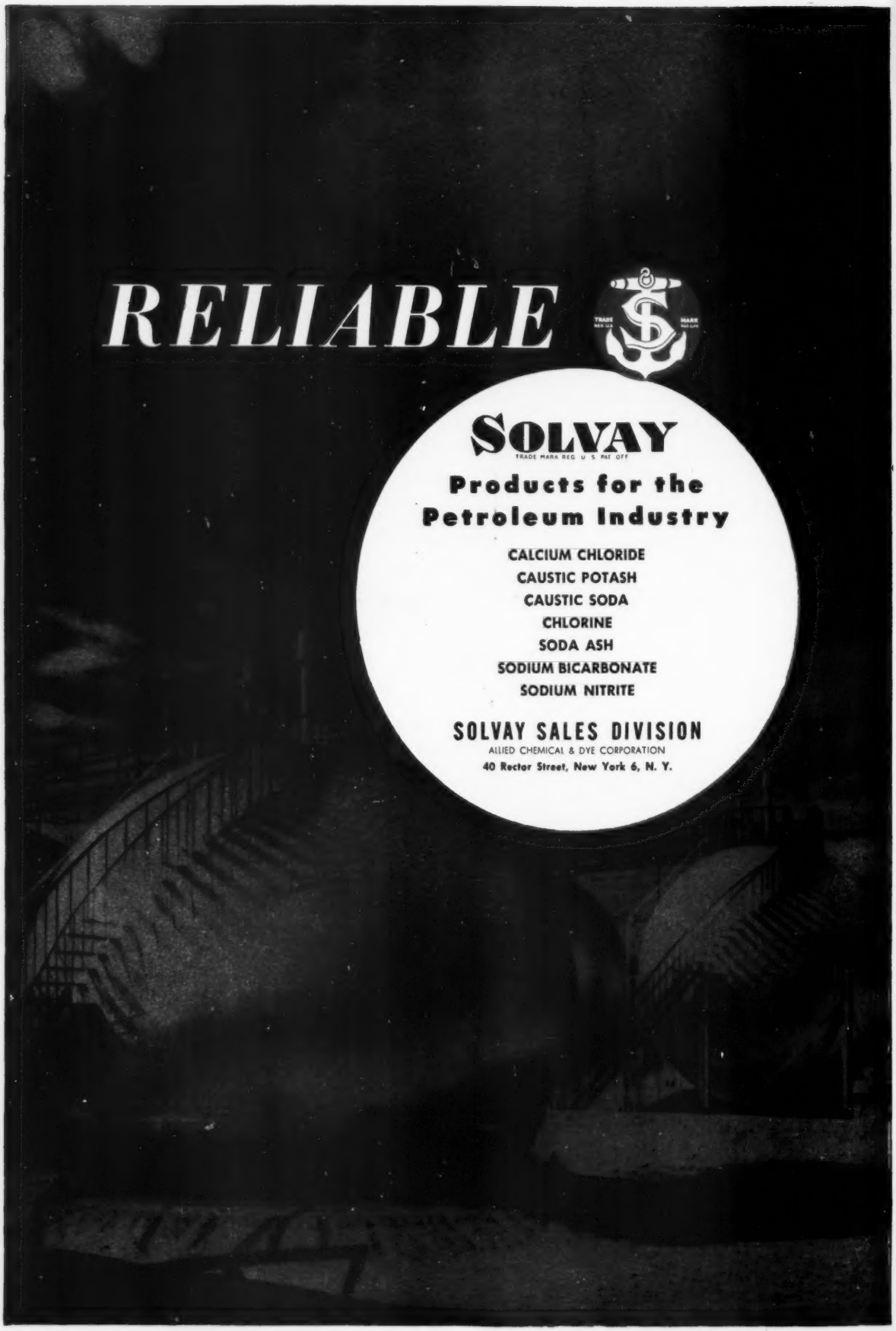
Serves them all

BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second Street, Tulsa, Okla.

Subsidiary of Bethlehem Steel Corporation

★ BETHLEHEM STEEL ★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Products for the Petroleum Industry
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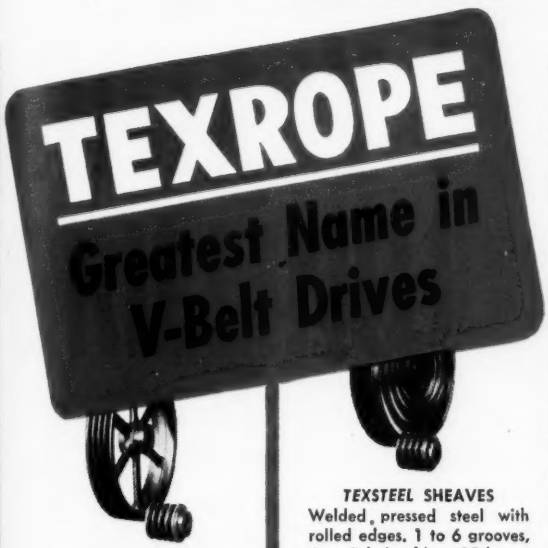
Fills Every Need for V-Belt Drives!

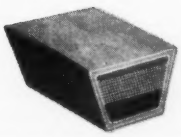


***TEXDRIVE* SHEAVES**
Cast Iron with 1 to 6 grooves for A and B belts. 1 to 25 h. p. *All sizes from stock.*

***VARI-PITCH* WIDE RANGE SHEAVES**
Speed range up to 100%. 1 to 4 grooves, Q and R belts, fractional to 30 horsepower. Delivery good. *Call your nearest District Office or Texrope dealer.*

***TEXSTEEL* SHEAVES**
Welded, pressed steel with rolled edges. 1 to 6 grooves, A or B belts, ¼ to 25 horsepower. *All sizes from stock.*

STANDARD CAST IRON SHEAVES
Made to order from stock patterns. 1 to 14 grooves, A, B, C, D, or E belts, 1 to 1000 horsepower. Delivery good. *Call your nearest District Office or Texrope dealer.*



***TEXROPE* SUPER-7 V-BELTS**
Wide range of types, sizes and sections to suit all operating conditions. *All standard sizes from stock.*

***MAGIC-GRIP* SHEAVES**
Semi-steel with patented taper bushing. On and off in a jiffy. 2 to 12 grooves, B, C, or D belts, 2 to 250 horsepower. *All sizes from stock.*

SPECIAL CAST IRON AND STEEL SHEAVES
Any number of grooves for A, B, C, D, or E belts. Up to 6000 horsepower. Delivery good. *Call your nearest District Office or Texrope dealer.*

***TEX-IRON*, SHEAVES**
Light weight single groove sheave for fractional horsepower applications. *All sizes from stock.*

***VARI-PITCH* STANDARD SHEAVES**
Speed range 9% to 28%. 2 to 10 grooves, A, B, C, D, or E belts, 1 to 300 horsepower. Stationary or Motion Control. Delivery good. *Call your nearest District Office or Texrope dealer.*

***VARI-PITCH* SPEED CHANGERS**
Speed range to 375%. 1½ to 75 horsepower. Single handwheel controls speed. Delivery good. *Call your nearest District Office or Texrope dealer.*

Best Delivery in the Industry!

NOW *YOU CAN GET* nearly every standard V-belt drive component from Texrope stocks. Even on non-stock items, Texrope delivery is the best in the industry. And Texrope is the *only* brand that meets *every* V-belt need.

Selecting a drive is as easy as looking up a telephone number in the 144 page Texrope Pre-Engineered Drive book. Covers 90% of all V-belt drives. Write today for Bulletin 20 B 6956 or see your nearest Allis-Chalmers Authorized Dealer or District Office. Also listed in Sweet's.

ALLIS-CHALMERS, 1059A SO. 70 ST. A 2346
MILWAUKEE, WIS.

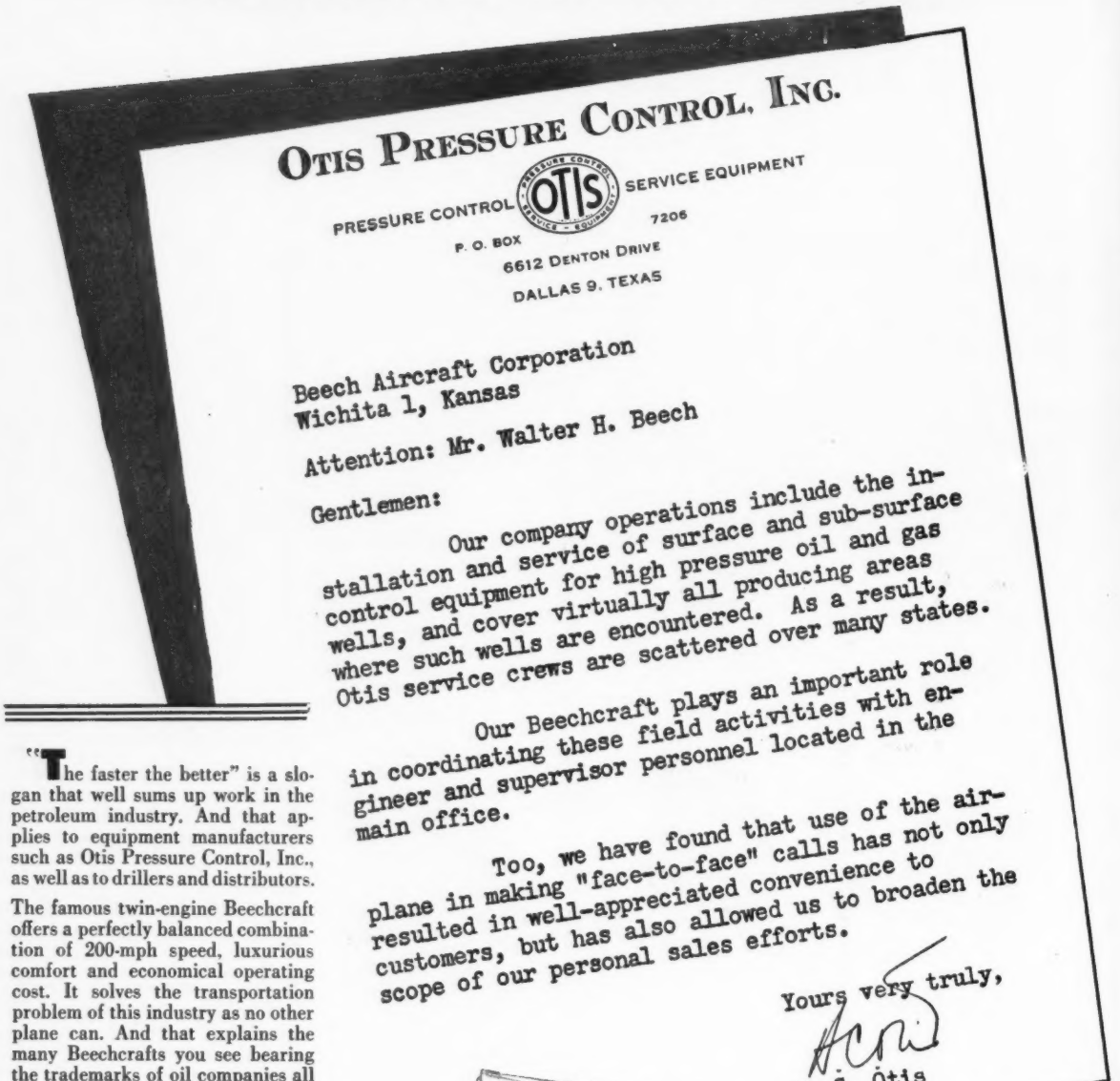
Texrope, Super-7, Vari-Pitch, Magic-Grip, Tex-Iron, Tex-steel and Texdrive are Allis-Chalmers Trademarks.

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.

ALLIS-CHALMERS

Originators of the Multiple V-belt Drive for Industry

Essential "equipment" for the petroleum industry -the Beechcraft Executive Transport



OTIS PRESSURE CONTROL, INC.

PRESSURE CONTROL SERVICE EQUIPMENT

P. O. BOX 7206
6612 DENTON DRIVE
DALLAS 9, TEXAS

Beech Aircraft Corporation
Wichita 1, Kansas

Attention: Mr. Walter H. Beech

Gentlemen:

Our company operations include the installation and service of surface and sub-surface control equipment for high pressure oil and gas wells, and cover virtually all producing areas where such wells are encountered. As a result, Otis service crews are scattered over many states.

Our Beechcraft plays an important role in coordinating these field activities with engineer and supervisor personnel located in the main office.

Too, we have found that use of the airplane in making "face-to-face" calls has not only resulted in well-appreciated convenience to customers, but has also allowed us to broaden the scope of our personal sales efforts.

Yours very truly,

H. C. Otis

"The faster the better" is a slogan that well sums up work in the petroleum industry. And that applies to equipment manufacturers such as Otis Pressure Control, Inc., as well as to drillers and distributors.

The famous twin-engine Beechcraft offers a perfectly balanced combination of 200-mph speed, luxurious comfort and economical operating cost. It solves the transportation problem of this industry as no other plane can. And that explains the many Beechcrafts you see bearing the trademarks of oil companies all over the world.

● A note on your company letterhead will bring an informative 60-page brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

BEECHCRAFT EXECUTIVE TRANSPORT MODEL 18

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

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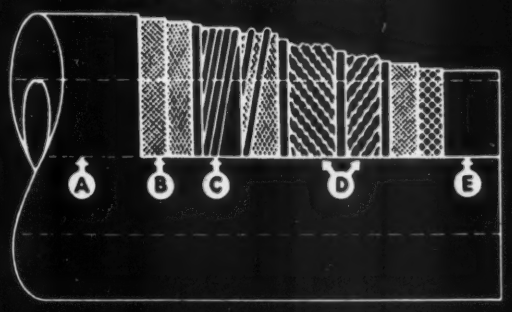
GOODYEAR INDUSTRIAL RUBBER PRODUCTS

G.T.M.-Specified STYLE 3153-H ROTARY HOSE

for high-pressure drilling



A – Heavy-gauge, extra-tough cover.

B – Multiple plies of heavy fabric.

C – End reinforcement of heavy wire.

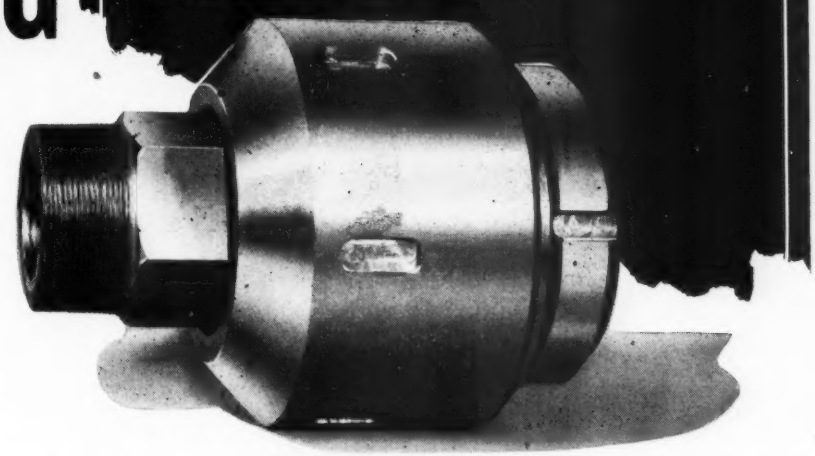
D – Two plies of high-tensile cabled-steel wire.

E – Oil-resistant synthetic rubber tube.

Here's a new improvement in

ROTARY DRILLING

Goodyear's STREAMLINED Rotary Hose Coupling



Your first look tells you — Goodyear's new streamlined rotary hose coupling is good news for drillers everywhere. The smooth outer cover of the coupling can't catch on the rig — won't cause time- and money-wasting delays while you straighten out a jam at the head of the line.

Inside you still get all the proved advantages of the Goodyear Coupling construction now in use on hundreds of rotary rigs. You get full flow, with maximum free length. Elimination of metal shanks makes the hose more flexible at the ends and easier to handle. And the absence of exposed metal inside the hose ends downtime caused by abrasive wear.

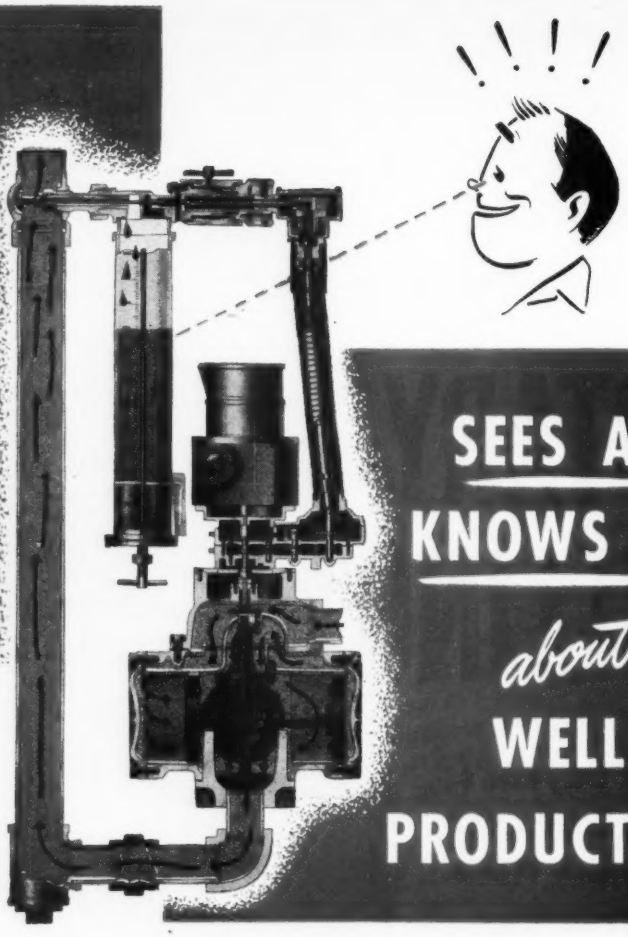
This new streamlined coupling is one more in the family of Goodyear products developed by the G. T. M. — Goodyear Technical Man — to give superior performance day after day throughout the oil industry. For full details, consult the G.T.M., phone your nearest Goodyear Industrial Rubber Products Distributor, or write Goodyear, Akron 16, Ohio.

We think you'll like "THE GREATEST STORY EVER TOLD" Every Sunday—ABC Network

GOODYEAR

THE GREATEST NAME IN RUBBER

the PITTSBURGH *Oil Field* METER AND SAMPLER



SEES ALL KNOWS ALL *about* WELL PRODUCTION

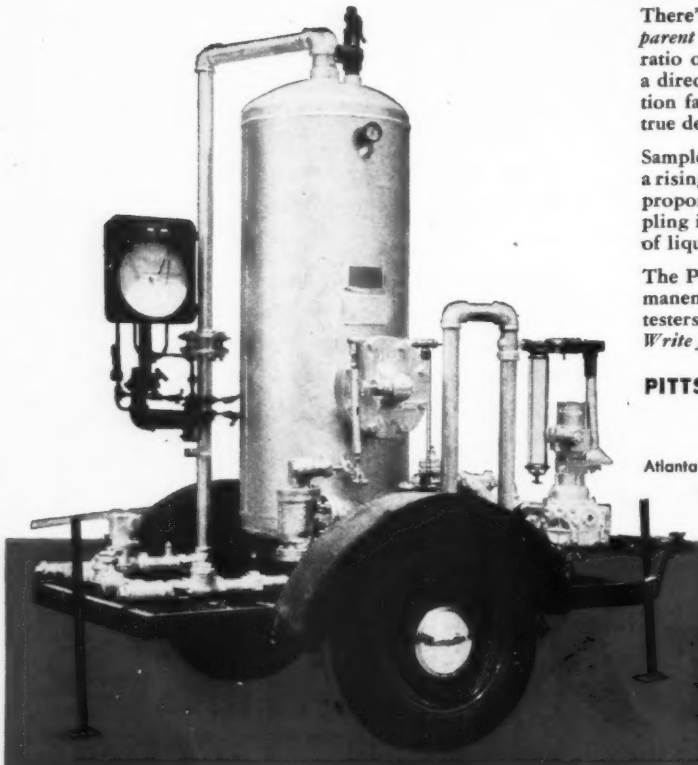
There's no crystal ball in this unit—but there is a *transparent* sampler tube. Through it you observe the exact ratio of well production—oil against water. And from a direct reading scale you can apply the proper correction factor to the meter reading so as to compute the true degree of crude output.

Samples are taken periodically and automatically from a rising stream where water and oil mix in relatively true proportion. A Pittsburgh Piston meter times the sampling intervals and accurately measures the total volume of liquid produced.

The Pittsburgh oil field meter and sampler can be permanently installed at a well head—or portable well testers (see below) can be used for spot field checking. *Write for bulletin OG-350.*

PITTSBURGH EQUITABLE METER DIVISION
ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

Atlanta Boston Chicago Houston Kansas City Los Angeles
New York Pittsburgh San Francisco Seattle Tulsa

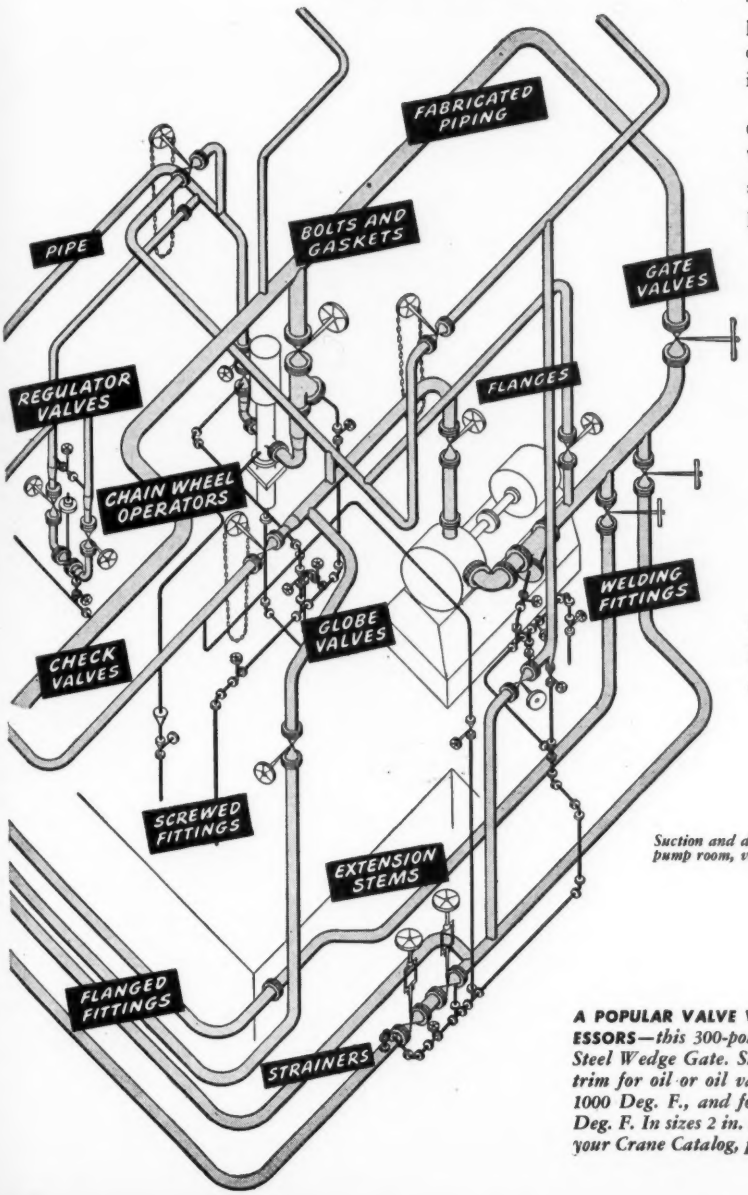


ROLO PORTABLE WELL TESTER

Daily mounted, this portable well tester includes a separator, connections from well, test header, an Emco orifice meter, Nordstrom valves and the Pittsburgh production meter with sampler. For additional information write Rolo Manufacturing Company, 2510 South Boulevard, Houston, Texas.

Everything you need in piping . . .
in one complete line

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



Suction and discharge piping in pump room, vapor recovery unit.

This Pump House Piping is a typical example of how Crane assures good piping performance, no matter how varied your needs. In valves, fittings, piping accessories and pipe, standardizing on Crane offers you complete selection from the world's leading supplier of quality piping equipment.

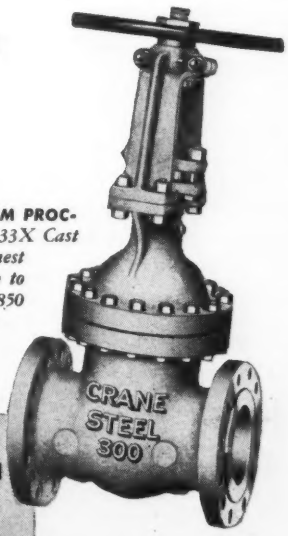
One order to your local Crane Branch or Wholesaler brings you the best in iron, steel, brass, and alloy piping materials . . . plus the benefit of this 3-way advantage:

ONE SOURCE OF SUPPLY helps to simplify all piping procedures—from design to erection to maintenance.

ONE RESPONSIBILITY for piping materials helps you to get the best possible installation and to avoid delays on the job.

OUTSTANDING QUALITY in every item from Crane means uniform efficiency and performance in every part of every piping system.

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers in All Industrial Areas.*



A POPULAR VALVE WITH PETROLEUM PROCESSORS—*this 300-pound Crane No. 33X Cast Steel Wedge Gate. Supplied with finest trim for oil or oil vapor services up to 1000 Deg. F., and for steam up to 850 Deg. F. In sizes 2 in. and larger. See your Crane Catalog, pg. 304.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

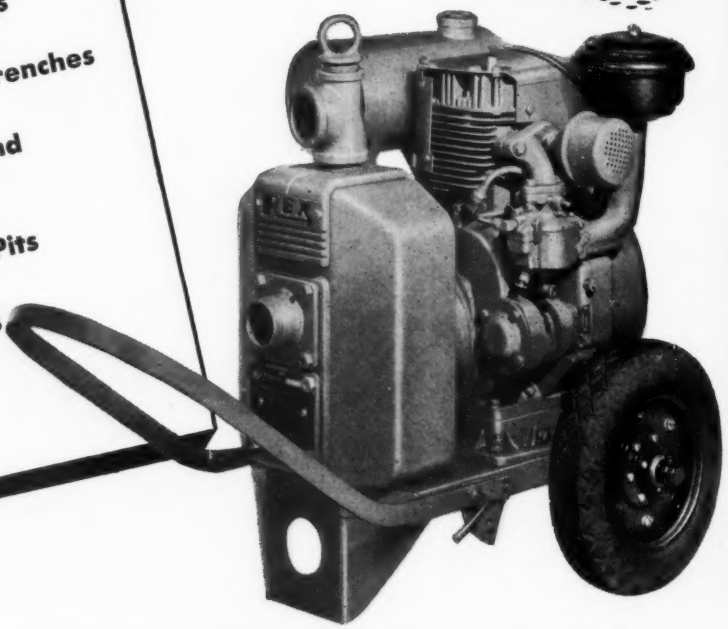
CRANE

FOR EVERY PIPING SYSTEM

THERE'S A NEW LITTLE YELLOW PUMP –

Around the Producing Wells!

- Lifting Oil to Separators
- Dewatering Firewall Trenches
- Transferring Oil to and from Storage
- Salvaging Oil from Pits
- Filling Water Tanks
- General Utility Service

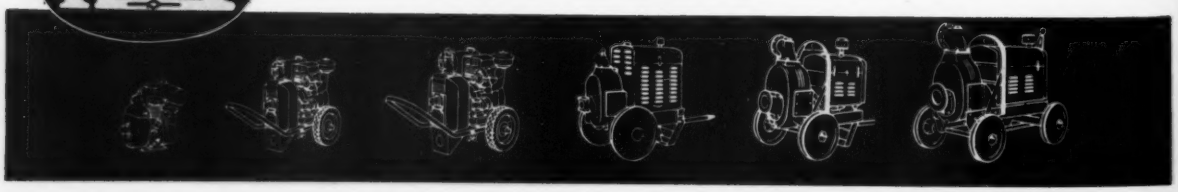


It's exceptional all-round pumping ability *plus* top portability that makes the *new* little yellow Rex Pump so popular in the fields. Just wheel it wherever you want to set it up, start the motor and forget it. It will keep right on pumping until the job is done.

With the new press-formed pump body and volute, the new Rex Pump is much lighter than old-fashioned cast pumps. And it's even more durable. The body won't crack or shatter under rough handling. It's built to give you a lot of dependable service. An important feature of the little yellow pump is its ability to handle vapors without losing its prime. The exclusive adjustable "air peeler" peels air or vapor from the impeller and rushes it out through the discharge, assuring a constant prime.

For all the facts on the new little Rex Pump, see your Rex Field Engineer, your local supply store, or write direct to Chain Belt Company, 1619 West Bruce Street, Milwaukee 4, Wis.

REX **OIL FIELD PUMPS**



CHAIN BELT COMPANY of MILWAUKEE

DU PONT TETRAETHYL LEAD COMPOUNDS

Chemical Research . . .

Contributing to Better Fuels

TO HELP THE REFINER meet the exacting demands of improved internal combustion engines, Du Pont's Petroleum Chemicals Division is engaged in a long-range program of fuel research. This is an integrated program involving chemical, physico-chemical and engineering investigations.

THE CHEMICAL STUDIES are largely conducted by the Jackson Laboratory. As early as 1922, the Jackson Laboratory was working on the commercial production of tetraethyl lead compounds, and this led to Du Pont's successful manufacturing process. Constant effort since has resulted in many improvements in both manufacturing equipment and methods.

TODAY, the Jackson Laboratory is applying chemical knowledge acquired over many years to the development of new chemical compounds for use as antiknock agents and other petroleum additives. This is research to help the Petroleum Industry produce improved fuels for the requirements of the future.

The Du Pont Jackson Laboratory, located at Deepwater, New Jersey, is the main research laboratory for Du Pont's Organic Chemicals Department. Here chemical research applied to fuel and lubricant problems is setting the stage for improved products in the future.

DU PONT

BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY

TETRAETHYL LEAD COMPOUNDS

AVIATION MIX

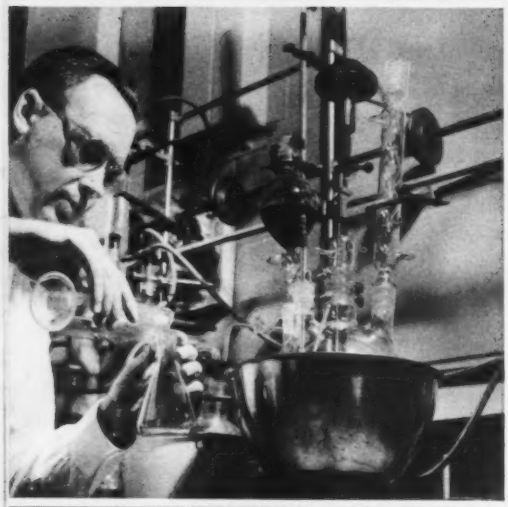
MOTOR MIX

Gasoline Oxidation Inhibitors

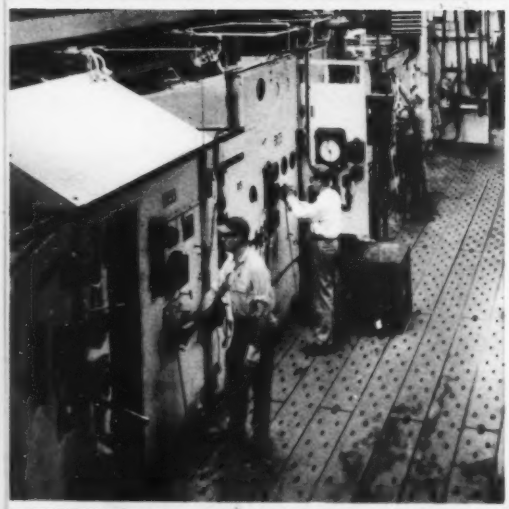
Gasoline Dyes

Lubricating Oil Additives

Fuel Oil Additives



Laboratory apparatus for synthesizing new chemical compounds. These are used as additives to improve the quality of fuels and lubricants.



Semi-works installations in the Jackson Laboratory for proving the practicability of laboratory developed processes before full-scale manufacturing equipment is built.

CHEMICAL RESEARCH

Applied to Today's Problems ...Tomorrow's Needs

The Jackson Laboratory is staffed with personnel thoroughly experienced in many phases of chemical research. Its facilities include much specialized equipment, from that required for synthesizing new chemical compounds to the complicated semi-works installations which try out many new manufacturing processes before full-scale production is begun.

The new chemical compounds resulting from Jackson Laboratory research are evaluated by the engineering and testing laboratories of the Petroleum Chemicals Division, for use as antiknock agents and other additives. These laboratories also develop basic engineering information to help the chemists in their search for new materials. The work of all these laboratories is supplemented by the findings of Company-wide research which are constantly examined for possible application to industry needs.

Thus, through chemical research, Du Pont is helping the Petroleum Industry produce better petroleum products . . . today and tomorrow.

DU PONT

REG. U.S. PAT. OFF.

Better Things for Better Living . . . Through Chemistry

E. I. DU PONT DE NEMOURS & COMPANY (INC.)

PETROLEUM CHEMICALS DIVISION

Wilmington 98, Delaware

Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Tex. · El Monte, Calif.

District Offices: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Tex. · Los Angeles, Calif.

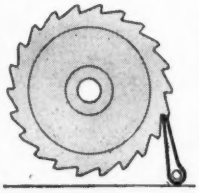
RATCHET BITES DOG!

NEWS? You bet it's news when the personal safety of the man on the job is better guarded. On that score, AMERICAN hoists have earned banner headlines . . . for accidents that *didn't happen!*

The drawings at the left show the importance of "the ratchet that bites the dog"—a safety device built into every AMERICAN hoist. Others, equally important, are: welded steel beds . . . simple, foolproof control levers . . . sure acting foot brakes . . . and protected chain drives.

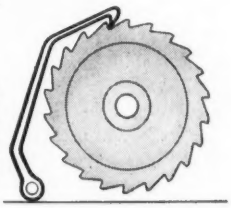
All of these features have double value. Along with greater safety, each contributes to faster, heavier work output. And that's a combination that adds up to *more profit per hour!*

Here's the Difference:



COMPRESSION-TYPE DOG, used in all AMERICAN hoists, is the safest kind of ratchet holder ever devised. It is actually stiffened—not stretched—by the "bite" of the ratchet. Made of high quality steel, these rigid spring-loaded dogs are your assurance of safety on any AMERICAN hoist.

TENSION-TYPE DOG, used in many variations of the hook style shown here, puts an exactly opposite stress on the metal. The greater the load, the greater the tension. In addition, of course, this type of design requires a longer, heavier dog.



American Hoist

and DERRICK COMPANY

St. Paul 1, Minnesota

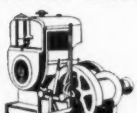
Plant No. 2: So. KEARNY, N. J. • *Sales Offices:* PITTSBURGH • CHICAGO SAN FRANCISCO • NEW YORK • NEW ORLEANS

B108

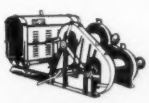
Ask Your Distributor

THE WIDE LINE OF AMERICAN HOISTS OFFERS THE RIGHT SIZE, THE RIGHT TYPE, THE RIGHT POWER, FOR ANY JOB

Roofer's Hoist
500 lbs. S.L.P.



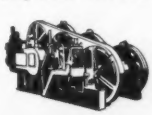
Single Drum Hoist
2,500 lbs. S.L.P.



Double Drum Hoist
7,500 lbs. S.L.P.

Three Drum Hoist
10,000 lbs. S.L.P.

Four Drum Steam Hoist
25,000 lbs. S.L.P.



Three Drum Hoist
40,000 lbs. S.L.P.

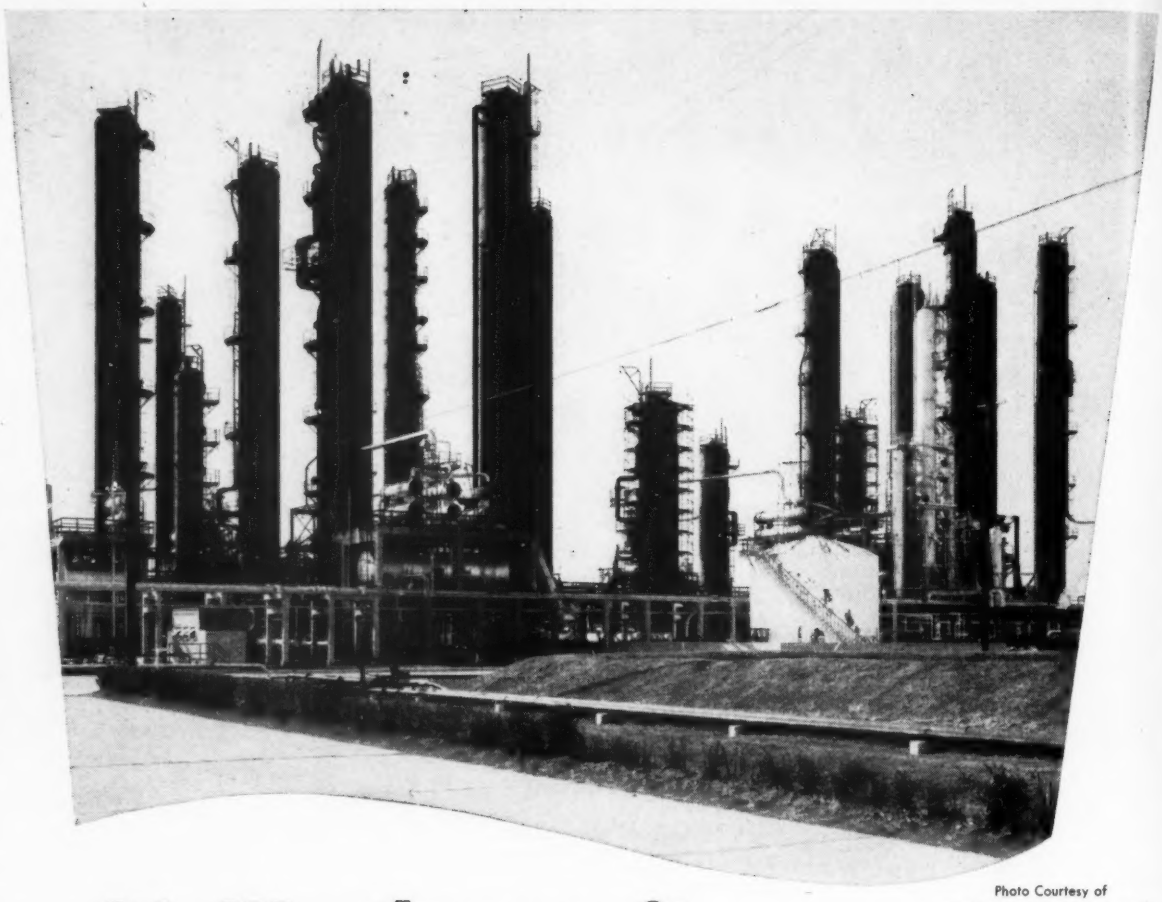


Photo Courtesy of
Neches Butane Products Company,
Port Neches, Texas.

It's Weatherproof!

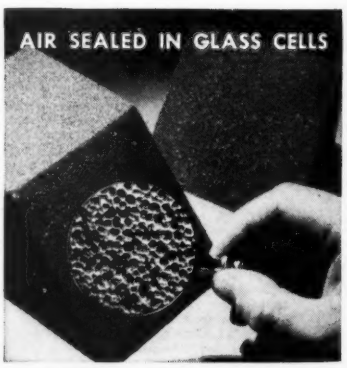
That is one of the main reasons why PC Foamglas is the permanent insulation.

Neither the winter's cold nor the summer's heat can impair the insulating properties of PC Foamglas. It is impervious to rain, snow and sleet. It needs no protective covering, no costly maintenance, repairs or replacement. It's *weatherproof.*

And thus, common causes of insulating material failure are eliminated when you insulate hot and cold piping, tanks, towers and retorts, ducts, breeching, heat exchangers and other processing equipment with PC Foamglas.

PC Foamglas is a *true* glass. Consequently, Foamglas insulation is also waterproof, vaporproof, fireproof, fumeproof, acidproof. It is not affected by strong solvents in common use in processing plants. These are additional reasons why, when installed according to our specifications for recommended applications, PC Foamglas retains its original insulating efficiency *permanently.*

Our insulating specialists will be glad to tell you how PC Foamglas can help solve your individual insulating problems. Just write—without obligation—to Pittsburgh Corning Corporation, Room 520-8, 632 Duquesne Way, Pittsburgh 22, Pennsylvania.



THE MAGNIFIED CROSS SECTION of PC Foamglas shows its cellular structure . . . glass bubbles solidified into big, strong, rigid blocks. In the millions of cells of glass-enclosed air lies the secret of its insulating value.

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FOAMGLAS INSULATION

FOR ADDITIONAL INFORMATION SEE OUR INSERTS IN SWEET'S CATALOGS.

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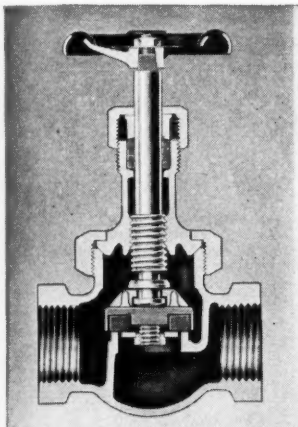
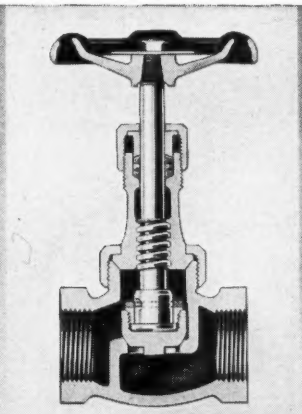
R-P&C VALVES

for low-cost flow control

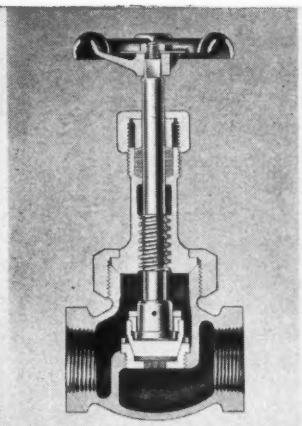
Here are a few of the more popular numbers in Reading-Pratt & Cady's **BRONZE** ***line***



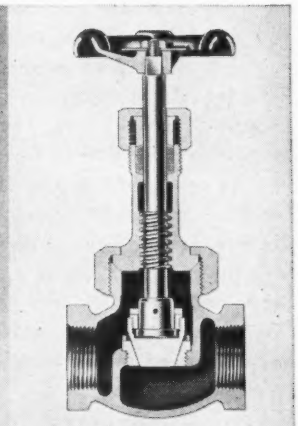
Union Bonnet Globe (or angle). With renewable, interchangeable discs for general services.



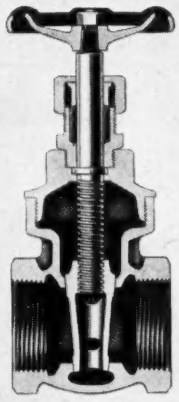
Union Bonnet Globe (or angle). Discs may be reground without removing valve from line. For occasional throttling.



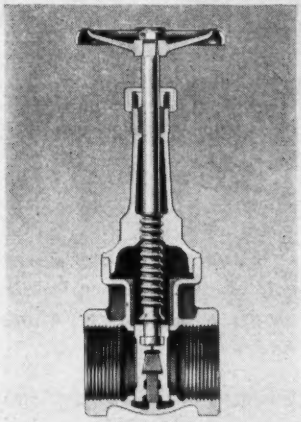
Union Bonnet Globe (or angle). Semi-plug type for frequent throttling service. Renewable copper nickel alloy disc and seat ring.



Union Bonnet Globe (or angle). Full plug type for severe throttling service. Renewable copper nickel alloy disc and seat ring.

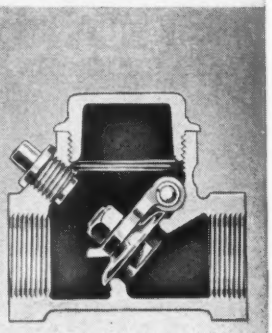


Stationary Stem Gate. Solid wedge renewable. Wedge can be reversed if one side becomes worn.



Rising Stem Gate with double disc. Disc easily assembled or taken apart—yet cannot work out of place.

SHOWN HERE are some of the numbers in the R-P&C line of high quality bronze valves. R-P&C also make iron and steel globe, angle, gate and check valves—iron cocks and Lubrotite gate valves—Bar Stock valves of bronze, carbon steel and alloy steels—cast steel fittings. Get in touch with your Reading-Pratt & Cady Distributor.



Swing Check Valve. Has renewable disc, regrinding seat. Disc free to rotate, thus distributes wear uniformly.

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Layne Well Water Systems are known to be the best made for serving the needs of the petroleum industry. They are built to stand up under the hardest kind of use and still maintain their high efficiency. Seldom do they need repairs of any nature. Once installed and in operation, they keep right on going with little or no attention.

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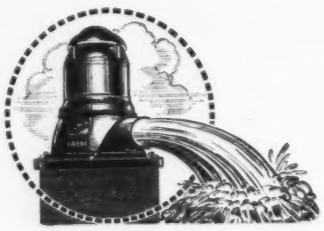
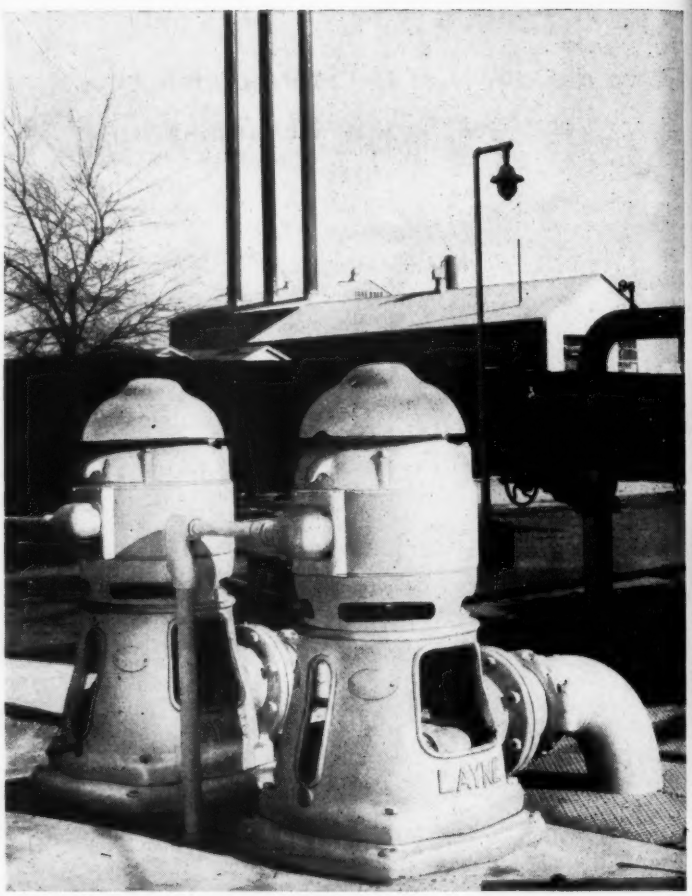


Layne Vertical Turbine Pumps are available in sizes from 40 to 16,000 gallons per minute. Write for pump catalog.



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"You see, we figure that National, being the biggest and most experienced company in the business, ought to know how to make oil country goods if anybody does. Yes, and from what I've seen around other jobs, I'll continue to use NATIONAL *Seamless* all the way!"

You, too, will find that by standardizing on NATIONAL Seamless drill pipe, casing, and tubing, you will be better able to sink your well in a minimum of time . . . and with a minimum of down-the-hole trouble . . . regardless of the depth you have to go . . . or conditions encountered.

Absolutely seamless from end to end, U·S·S NATIONAL Seamless Tubular Products have been improved in both steel composition and physical properties to give them higher collapse resistance and increased joint strength. For complete data, write National Tube Company, Frick Building, Pittsburgh, Pa., for a copy of Bulletin No. 15.

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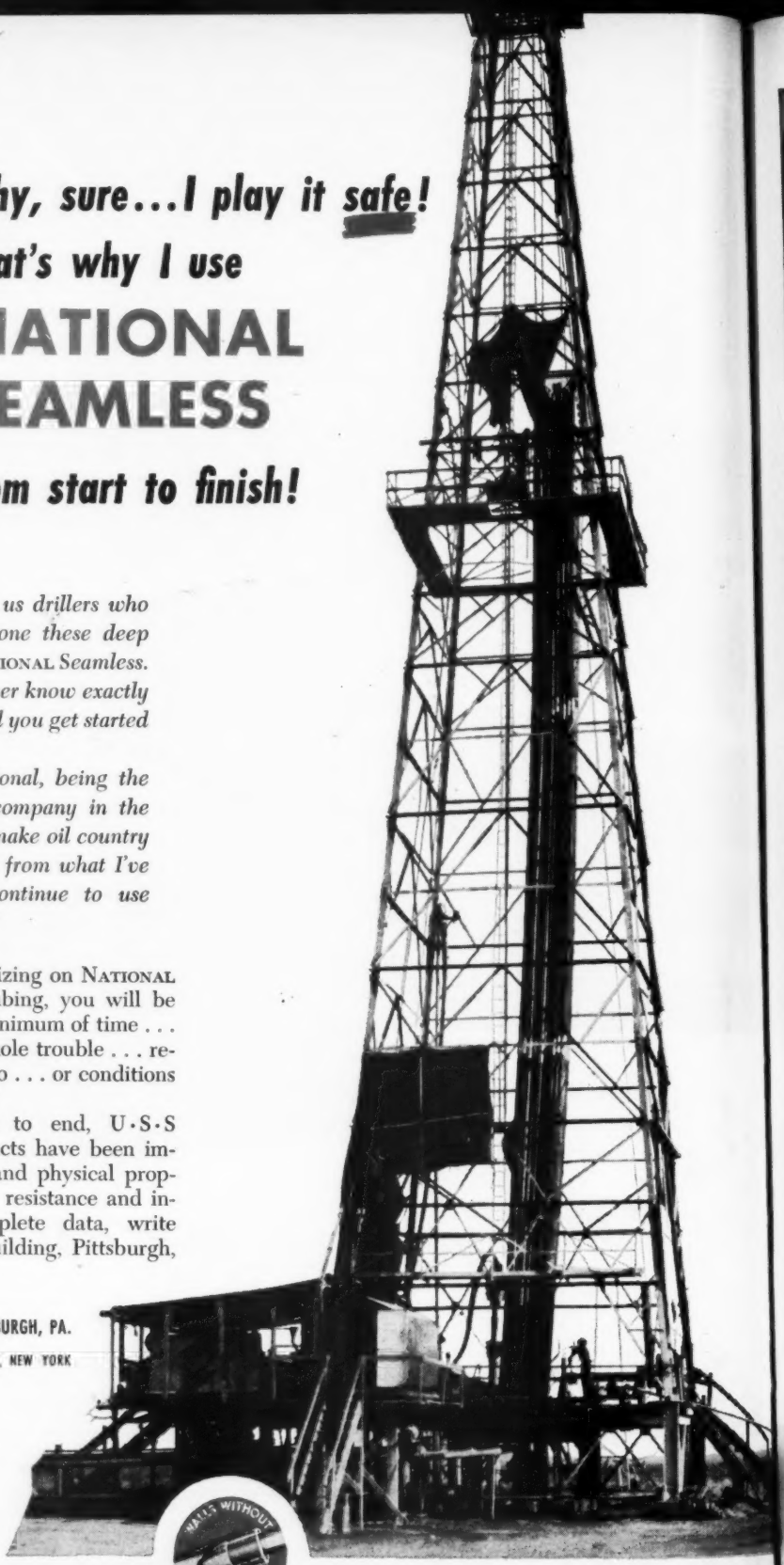

USS

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drill pipe... casing... tubing

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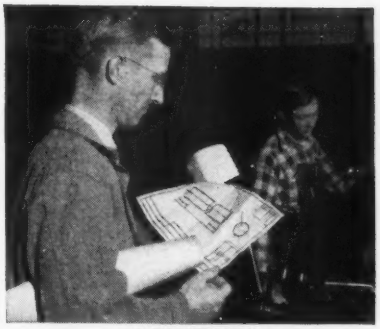
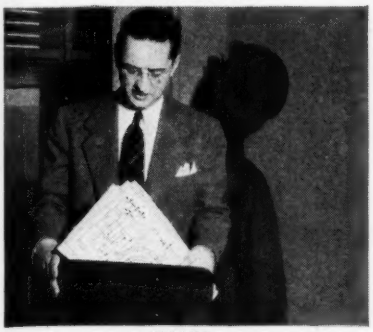


PRODUCTION



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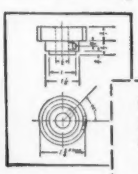

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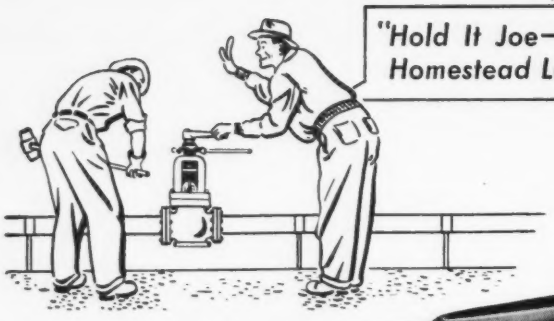

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LEVER-SEALD Valves

ALWAYS WORK LAST LONGER COST LESS PER YEAR

STICKING valves are never a problem with Homestead Lever-Sealds on the job. Built into each valve is a powerful leverage, ready at all times to overcome the effects of corrosion, viscous fluids or temperature and pressure extremes which cause ordinary valves to stick or "freeze."

This powerful leverage not only relieves pressure between the seating surfaces to permit operation under all conditions; but it also is the means of providing the extra tight seal against leakage—the seal which keeps corrosive or erosive line fluids away from the seating surfaces; assures longer valve life and lowest cost per year.

Made in stainless steel, steel, semi-steel, bronze, monel or other alloys suitable for the working conditions under which they are to be used, Homestead Lever-Seald Valves may be had in sizes from 1" to 12"; and for working pressures from 150 pounds to 1500 pounds.

Choose the sizes and types for your services from Reference Book 39 Section 3. Write for your free copy today.

Check these Outstanding Features:

A QUARTER-TURN fully opens or closes valve.

INSTANT STICK-PROOF OPERATION. Plug turns freely after seating pressure is relieved by screw lever.

POSITIVE LEAKLESS SEAL is obtained by applying full seating pressure with screw lever after opening or closing.

LEAK PROOF. Deep stuffing box, gland and sealed bottom prevent fluid loss, and reduce hazards.

STRAIGHT-LINE FLUID FLOW. Little or no pressure drop.

SEATING SURFACES ALWAYS PROTECTED in both open and closed positions. Fluid or grit cannot damage valve seat.

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P. O. BOX 403 CORAOPOLIS, PENNA.

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from Lucey Boilers

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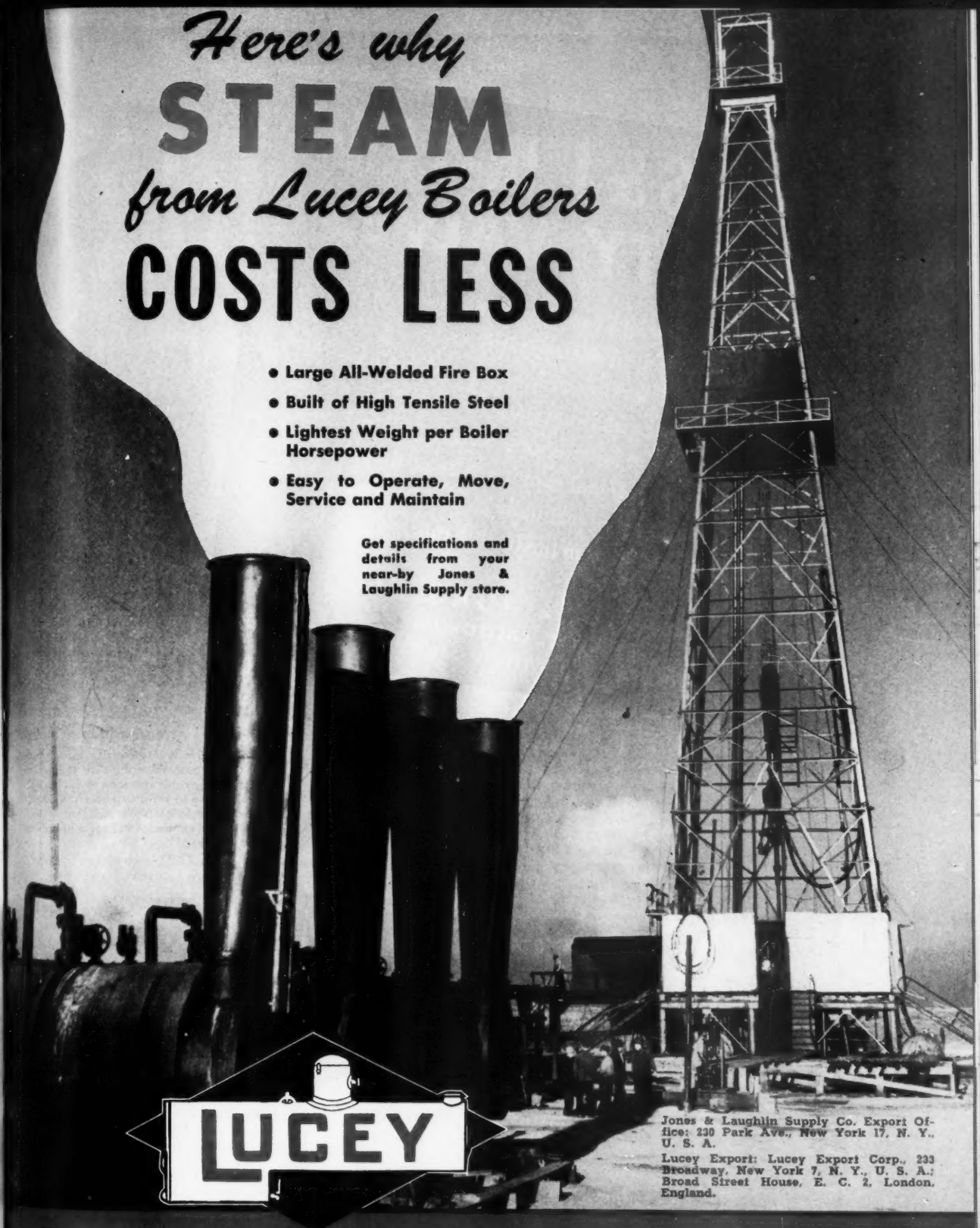

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S. & J. Internal Safety Valves are designed to protect the inflammable liquids in refinery and bulk storage tanks from the hazards of fires around the bases of tanks. The closure is always made inside the tank and is actuated by the melting of a fusible link. ☆ In the event of any accidental rupture of lines, the internal safety valves may be manually closed by simply unhooking the cable from the fusible link.

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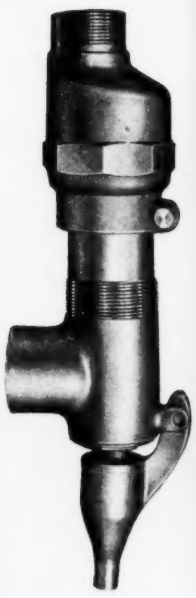

FIGURE ST-2001

This internal valve is designed to draw off water from the bottoms of storage tanks. The internal parts are self draining and will not freeze in cold weather.

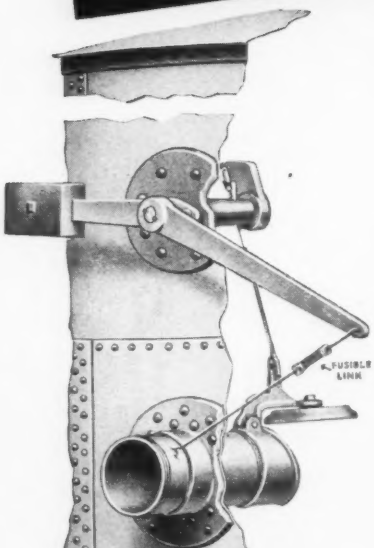

FIGURE ST-709

In this model a valve disc on a counterweighted arm is held in the open position by a cable attached to a fusible link. Closes automatically when fire melts the fusible link.

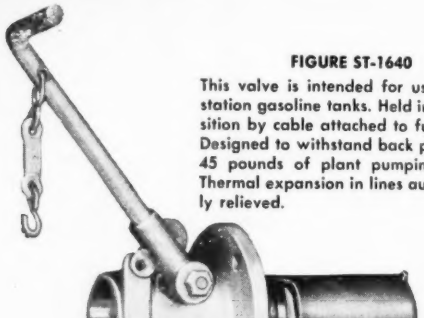

FIGURE ST-1640

This valve is intended for use on bulk station gasoline tanks. Held in open position by cable attached to fusible link. Designed to withstand back pressure of 45 pounds of plant pumping system. Thermal expansion in lines automatically relieved.

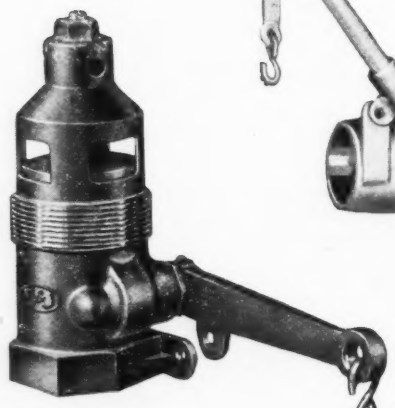

FIGURE ST-885

This model, illustrated at the left, is designed for bulk station distributing tanks. It is a spring loaded valve held in open position by a cable attached to a fusible link. Automatically provides for relief of thermal expansion in the lines.

S&J

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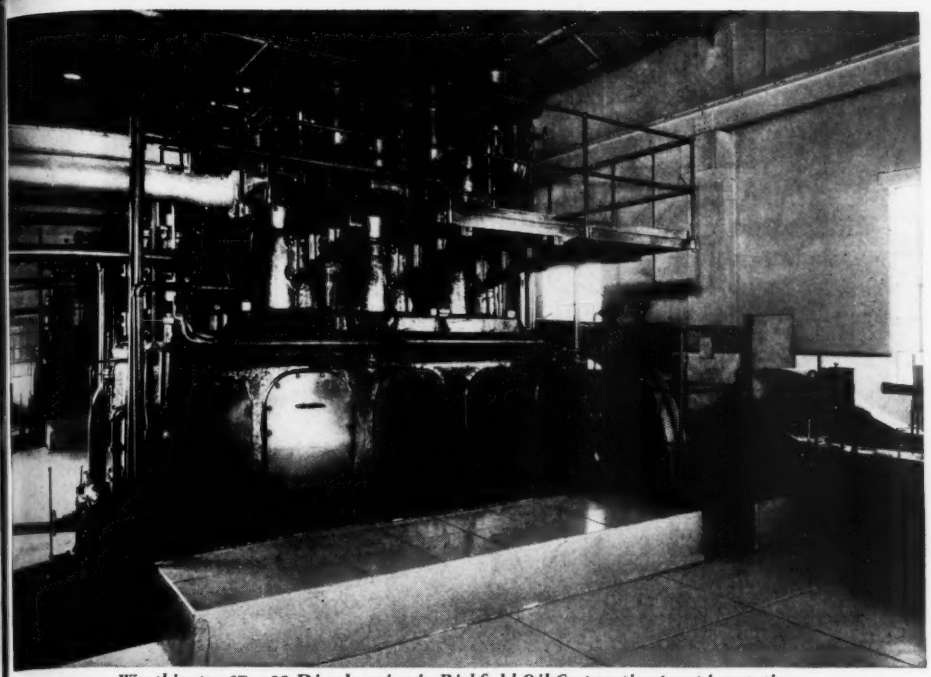


Worthington 17 x 25 Diesel engine in Richfield Oil Corporation pumping station

How Much Wear Should an Engine Suffer in 23 Years?

In 1924, ten Worthington 17 x 25 3-cylinder air injection Diesel engines were installed on the Richfield Oil Corporation's pipe line from Taft to Wilmington, Calif., to drive pumping equipment.

This 10-inch pipe line extends 127 miles, crossing coastal mountain ranges, and carries crude oil varying from 22 to 32 deg., API, at a rate of 27,000 to 33,000 barrels per day and a discharge pressure of 550 to 700 psi. There are five pumping stations, in each of which are two pumping units. The engines are rated 300 hp at 200 rpm.

The engines were put into operation early in 1925 and have been in virtually continuous service since then. Shutdowns over the 23-year period have been only for routine maintenance.

In 1948, a reconditioning program was begun, involving dismantling to a point permitting inspection of all wearing parts. Of the engines thus far overhauled, the maximum cylinder liner wear encountered was found to be .050 in. The Richfield company considered that with so little wear it would not be necessary to replace the liners or pistons.

Main bearings and Conrod bearings (with the exception of a single Conrod bearing) were found to be in excellent shape and were merely cleaned up and returned to service.

This performance is considered to be extremely good in view of the somewhat unfavorable conditions of cooling water and temperature. At most of the stations there is a scaling problem and it is necessary periodically to remove scale from jackets. Temperature of the water ranges from 80° F in winter to 100° F in summer.

Chemicals From Natural Gas

One of the first plants in the Texas territory to produce chemicals from hydrocarbons obtained from natural gas is Celanese Corporation of America's "Chemcel" Plant at Bishop, Texas.

The photograph shows a view of ten Worthington LTC-8 Angle Compressors, representing a total of 10,000 hp, processing formaldehyde, acetaldehyde, and acetic acid.

These ten compressors are only a portion of the thousands of dollars worth of Worthington equipment in use at the Celanese Corporation's Bishop plant. Among the other Worthington units are four-cycle gas engines, driving water circulating pumps, and between four and five hundred Worthington pumps of various sizes and types. Many of the pumps are "Worthite" Chemical Pumps.

Worthington Angle Compressors at Celanese Corporation's plant in Bishop, Texas

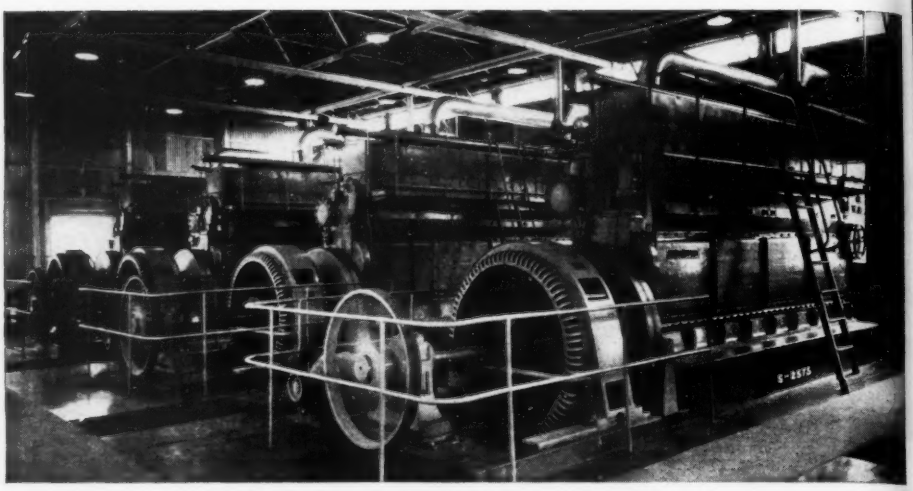
NEWS

FROM THE PETROLEUM FRONT

AS REPORTED BY THE DEVELOPMENT ENGINEERS, FIELD SERVICE REPRESENTATIVES AND CUSTOMERS OF WORTHINGTON

NEWS

from the petroleum front



Worthington natural gas engines for electric power generation.

Much Going on in Notrees, Texas

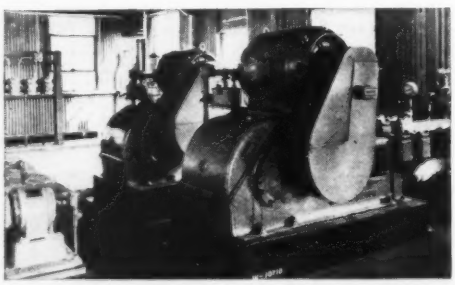
Shell Oil Company's TXL plant at Notrees, Texas, is processing 50,000,000 cu ft of raw gas per day for the purpose of recovering butane, propane and gasoline. There is a large quantity of dry natural gas left as a by-product and this is sold to a natural gas pipe line company for distribution and sale domestically and industrially.

Worthington pumps and gas engines take part in this enormous operation by—

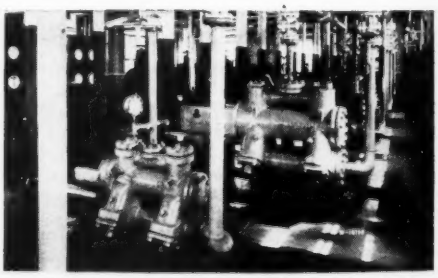
1. pumping finished products through a pipe line from point of storage to point of delivery. Worthington 5 x 10 KMS-1 power pumps are used, discharging against a pressure of 500 psi. Two 4½ x 12 KUF pumps are used when the discharge pressure is expected to near 1000 psi.

2. handling such duties as still reflux service, still transfer service, deethanizer feed, deethanizer reflux, depropanizer reflux, debutanizer reflux and condensate pumping. Worthington Hivol pumps of various sizes are used.

3. providing the power for the plant's entire electric requirements. Four Worthington DDG-8 natural gas engines are used, driving 525 kw generators—all units being derated for 3000 ft altitude.



Worthington power pumps at Shell's Notrees plant.



Worthington Hivol pumps on various duties.

Loading Cargo at 5,000 GPM

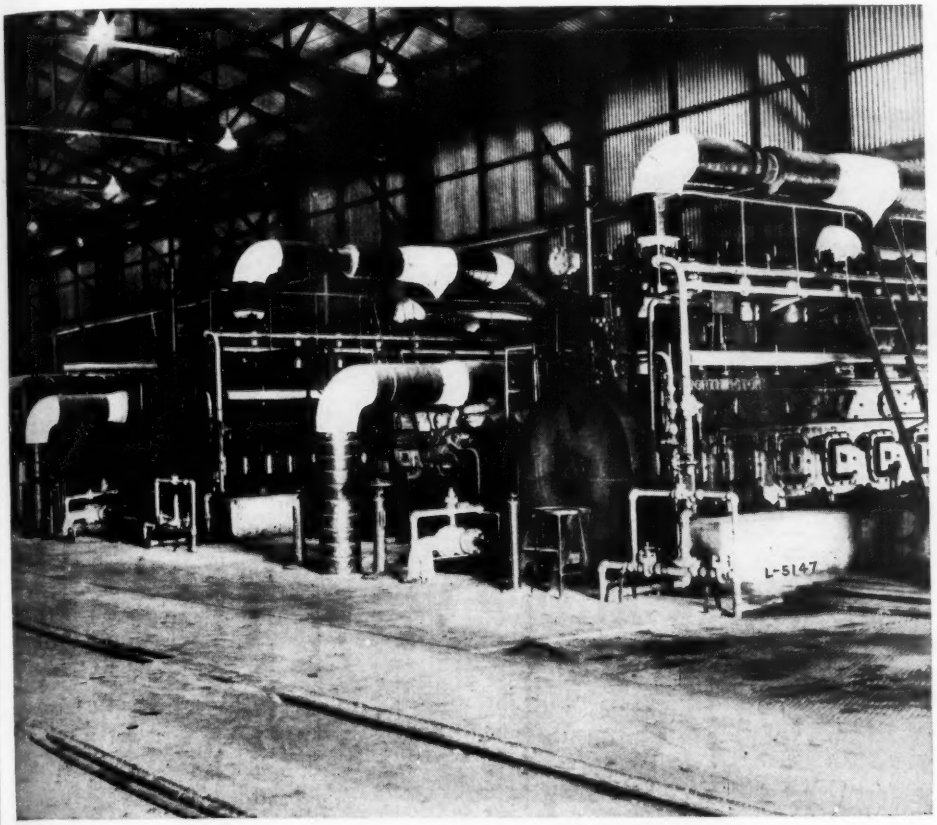
At the Union Oil Company's Oleum Refinery in California, two Worthington No. 12 GR Rotary Pumps with 450 hp motors and gears, are pumping over 5,000 gallons of fuel oil per minute, from elevated storage tanks down to the tankers at the docks. The pumps are handling grades of fuel oil up to No. 6.

Worthington Pumps loading cargo at Union Oil

petroleum NEWS

Worthington Pump and Machinery Corporation

Harrison, N. J.



Worthington Angle Gas Engine Compressors at Lion Oil Co.

War Veterans Still Operating Near Full Load

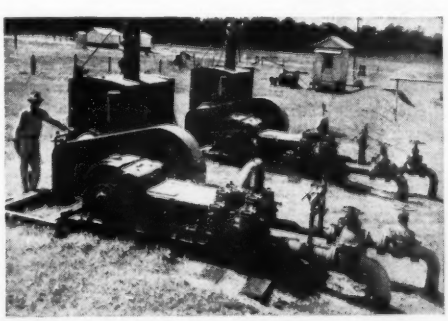
Five Worthington Ammonia Refrigeration Machines, and six Worthington Air Compressors, installed in February, 1942, at a plant then operated by Ozark Ordnance Works, are still running at near full load at the same plant, now owned by Lion Oil Company, Chemical Division, at El Dorado, Arkansas.

This plant, possessor of an exceptionally fine war production record, continues to operate at its efficient wartime peak, producing anhydrous ammonia and nitric acid.

The Ammonia Compressors are 2/2/13/13 x 15, compressing NH_3. The Air Compressors are 29½/29 /19 /19½ x 15. Two additional ammonia compressors are on order for a plant expansion program now under way.

Pressure Application

Two Worthington 5½ x 10 in. pumps being used on a pressure application in a Southwest refinery, pumping oil to the main line.



8-13

THE WORLD'S *Most Versatile* EXCHANGER

NOW MASS-PRODUCED AT LOW UNIT COST AND CONTINUALLY CARRIED IN STOCK

● It didn't happen overnight. More than 150,000 Ross "BCF" Exchangers, placed into service during the past few years, *set the pattern.*

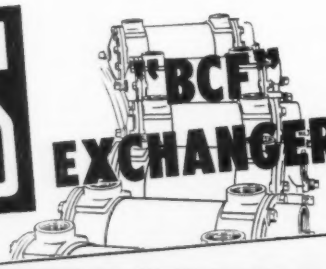
For, with such a large number of units doing a cooling, heating or condensing job in practically every type of industry, Ross was able to make thoroughly conclusive observations. A definite trend became apparent in the selection of individual assemblies from standardized "BCF" parts. Thirteen sizes and sets of dimensions clearly established themselves as the needs of the majority, as did certain refinements in construction and advancements in thermal engineering gained through practical observations in the field.

Thus, with the will of the majority expressed, these most-wanted features have become standardized in the *new "BCF" All-Nonferrous Exchanger, now mass-produced for low unit cost, and continually stocked at the Ross plant for prompt shipment.*

So whether you're a builder of primary equipment, furnishing exchangers with your units as original accessories, or whether you're an actual user of heat transfer equipment, you can be sure of more BTUs transferred per dollar invested with a mass-produced "BCF" than with any other exchanger.

★ NEW BOOKLET—*FREE*
Eight pages illustrate and summarize your benefits from the new "BCF". Ask for Bulletin 1.1K1 on your letterhead.

ROSS "BCF" EXCHANGERS



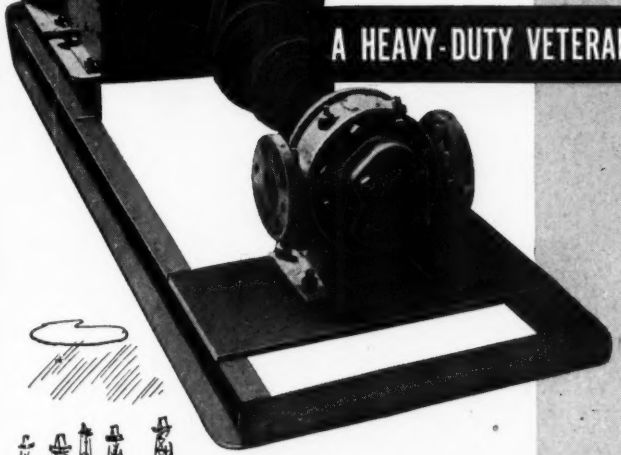
Ross Heater & Mfg. Co., Inc.
Division of American Radiator & Standard Sanitary Corporation
1417 WEST AVE. BUFFALO 13, N. Y.

In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

Serving home and industry
AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

Worthington Rotary Pump, Type GR, engine drive. Capacities to 5,000 gpm. Pressures to 500 psi. Available in a wide variety of drive arrangements, and with steam or water jackets.

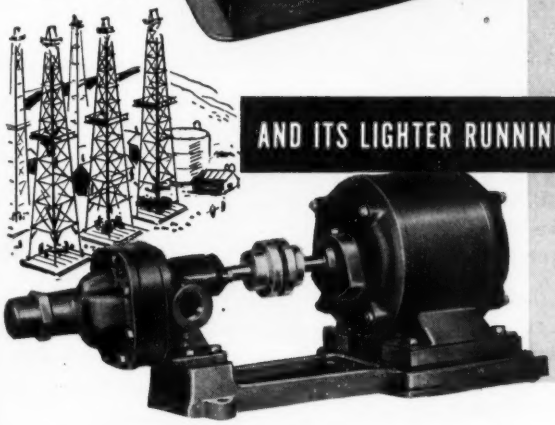
A HEAVY-DUTY VETERAN...



TWO ROTARIES THAT RATE *TOPS WITH OIL MEN*

IT takes a lot of unbeatable performance records to establish a worldwide reputation such as the Worthington Rotary Pump, Type GR, has enjoyed for many years. That's why today, in oil fields and refineries all over the globe, you find GR's the first choice for the broadest range of non-corrosive, non-abrasive liquid handling. Features like improved double-helical gears, inboard bearings and mechanical seals for overhung drives make an impressive design story. Read all about them in Bulletin W-487-10B.

AND ITS LIGHTER RUNNING-MATE...



JUST as thoroughly "proved in action," this newer and lighter Worthington Rotary Pump, Type GA, is an equally dependable performer in the small capacity, low pressure class. Quiet, efficient herringbone gears and four large, pressure lubricated bearings feature the simple, rugged design that assures years of low-cost, trouble-free service. Get the details in Bulletin W-484-B-1.

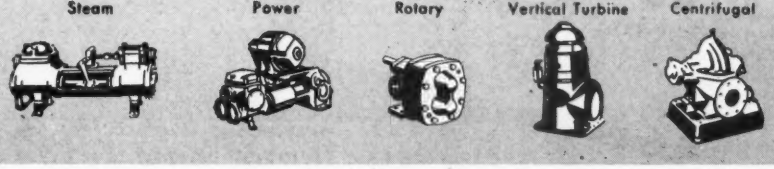
Worthington Rotary Pump, Type GA, motor drive. Capacities to 51 gpm. Pressures to 100 psi. Foot or flange mounted, with or without relief valve.

WORTHINGTON

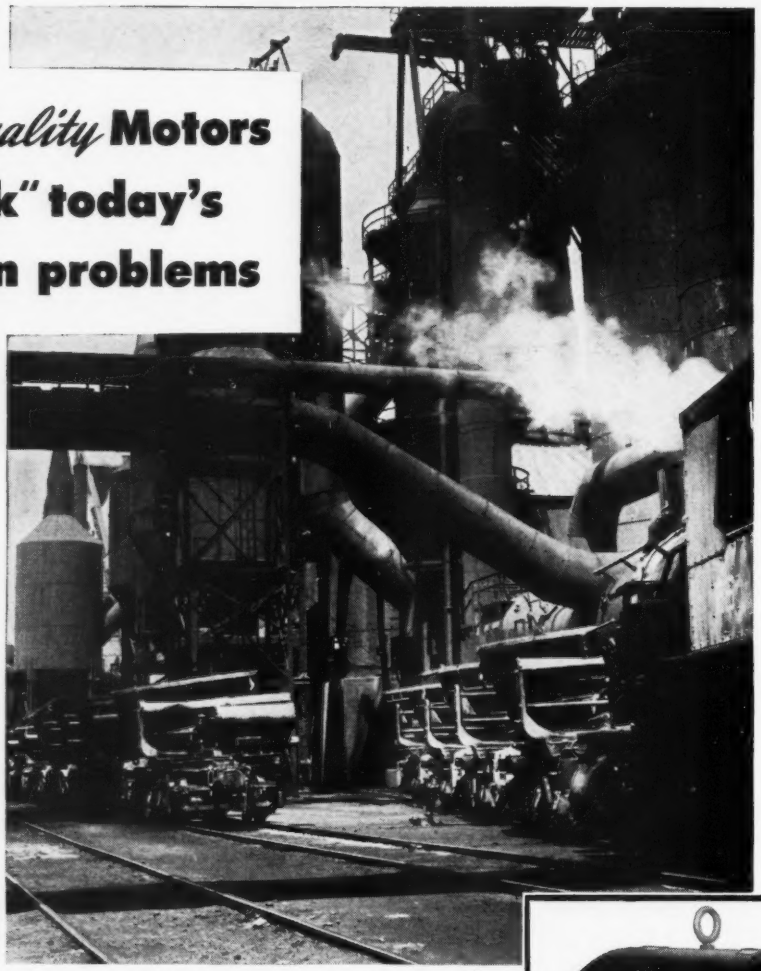
In these two amazingly efficient, economical rotary pumps you see the results of long, careful study of the oil industry's special requirements. Whether your own needs call for the GR, the GA or any other type of pump, remember this fact recognized by oil men everywhere . . . *There's more worth in Worthington! Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, New Jersey.*

P9-6

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB



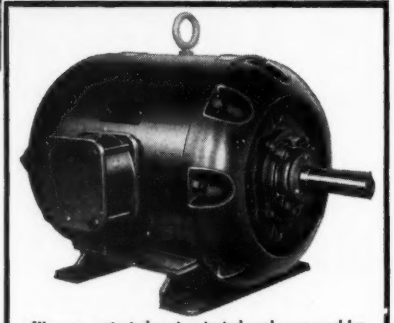
Wagner *Quality* Motors help "lick" today's production problems



In order to combat rapidly rising production costs, industry is placing greater emphasis on high-speed, economical production techniques. Down time is lost time—motor failures can prove more costly than ever before . . .

Wagner Quality Motors are famous for their dependability. They have the stamina to stand up under severe operating conditions—to stay on the job without frequent breakdowns—because they are made of highest quality materials and are engineered to do their job efficiently.

If you need motors that can help "lick" *your* production problems, whether large or small, consult the nearest of our twenty-nine branches. They are located in principal cities and are manned by experienced field engineers who will help you solve your motor application problems. Quick, convenient service facilities are available for users of Wagner Motors. Write for Bulletin MU-185 for information on the complete line of Wagner Quality Motors.

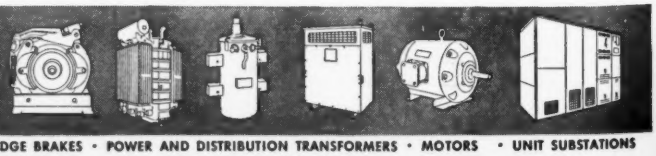


Wagner protected motor, tested and approved by Underwriters' Laboratories for Class 1 Group D and Class 2 Group G hazardous locations.

Wagner Electric Corporation
6389 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.

Consult Wagner Engineers on all Electric Motor Problems

Wagner Electric Corporation EST. WE 1891



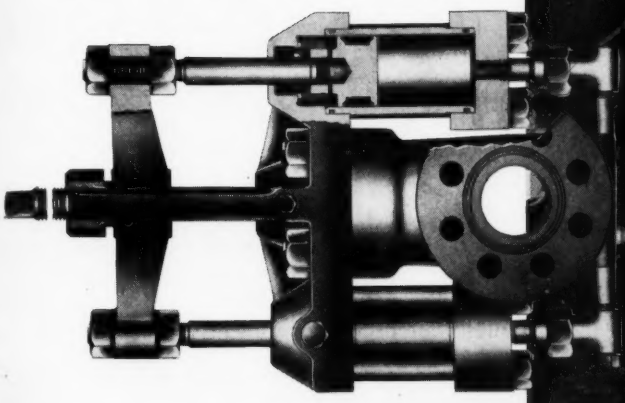
BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

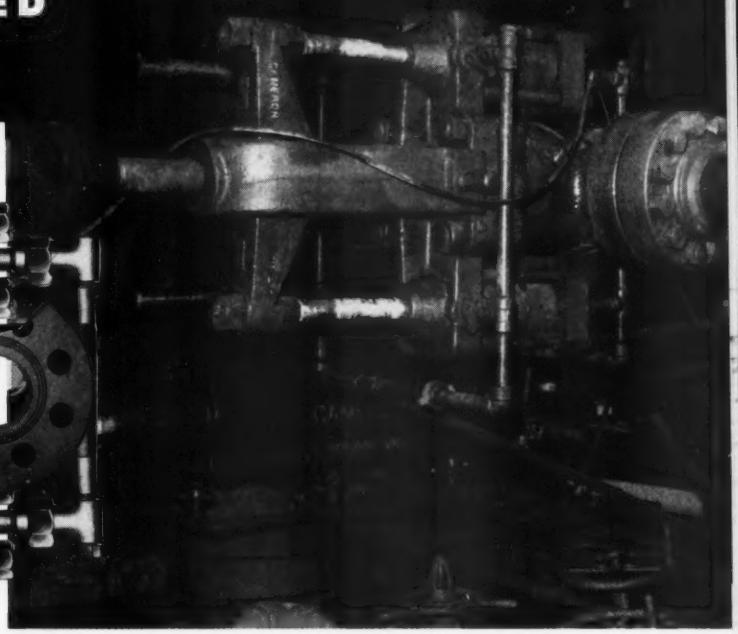
ELECTRICAL AND AUTOMOTIVE PRODUCTS

M48-12

Cameron

HCR (HIGH CLOSING RATIO) PRESSURE OPERATED GATE VALVE





COMPANION TO THE "QRC" FOR KEEPING WELLS UNDER CONTROL

Here's a combination that provides equal safety and protection against high pressures for the well bore and flowline . . . Cameron "HCR" (High Closing Ratio) Pressure Operated Gate Valves and Cameron "QRC" Pressure Operated Blowout Preventers.

Like its "QRC" companion, the Cameron "HCR" Valve has a closing ratio of well pressure to hydraulic operating pressure of approximately 8 to 1. It has an opening ratio of approximately 4 to 1. As a result, pressures action upon the ram type gate will be equalized when the hydraulic pressure applied to the operating cylinder is equal to one-fourth of the well pressure.

With drilling depths and pressures increasing steadily, many operators have standardized on this Cameron combination on land and water locations alike for maximum protection against loss of control.

Write for complete mechanical details or see your Composite Catalog.

CAMERON IRON WORKS, INC.
P. O. BOX 1212 HOUSTON, TEXAS

Export: 24 Trinity Place, New York, N. Y. Oklahoma: 310 Thompson Bldg., Tulsa (Telephone 28970). California: Long Beach (P. O. Box 267). Wyoming: 356 N. Wolcott St., Casper. North Louisiana: Bossier City (P. O. Box 425). Texas: Midland (Telephone 1982), Corpus Christi (Telephone 28783), Ft. Worth (Telephone 46522).

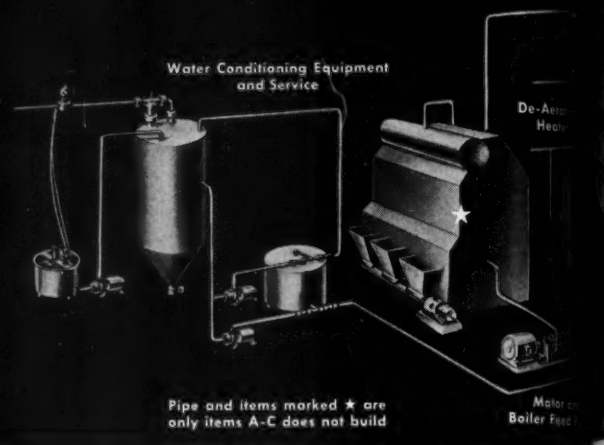
PETROLEUM EQUIPMENT "Buying Guide"

FOR FIELD, REFINERY, TRANSPORTATION

Need help for *new building — modernizing — expanding?* Get *practical, down-to-earth* buying assistance from Allis-Chalmers oil industry specialists, who *know* petroleum equipment needs!

And be *assured of unbiased recommendation* because you choose from the world's *widest range* of electric power and mechanical processing equipment!

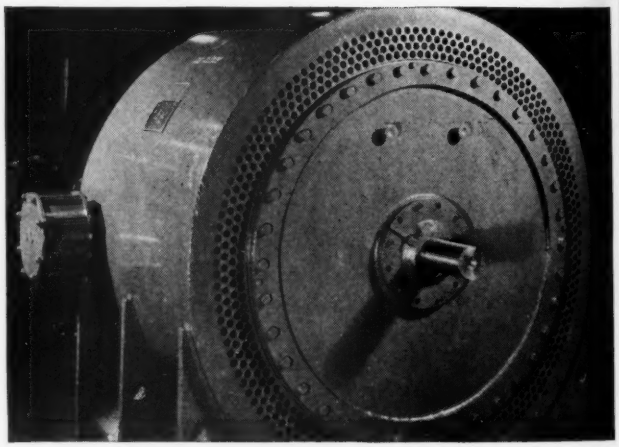
A-C specialists are as near as your phone. Call your A-C Office or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.



Power Generation

THIS IS *YOUR* POWER SYSTEM . . . in one form or another. Note that all but two pieces of equipment can be supplied by Allis-Chalmers . . . *builders of the most complete line of major equipment for the generation and distribution of power.*

Each of these Allis-Chalmers products is available in a wide variety of types and sizes . . . standard or specifically engineered. This range of equipment simplifies your ordering problems . . . means you can

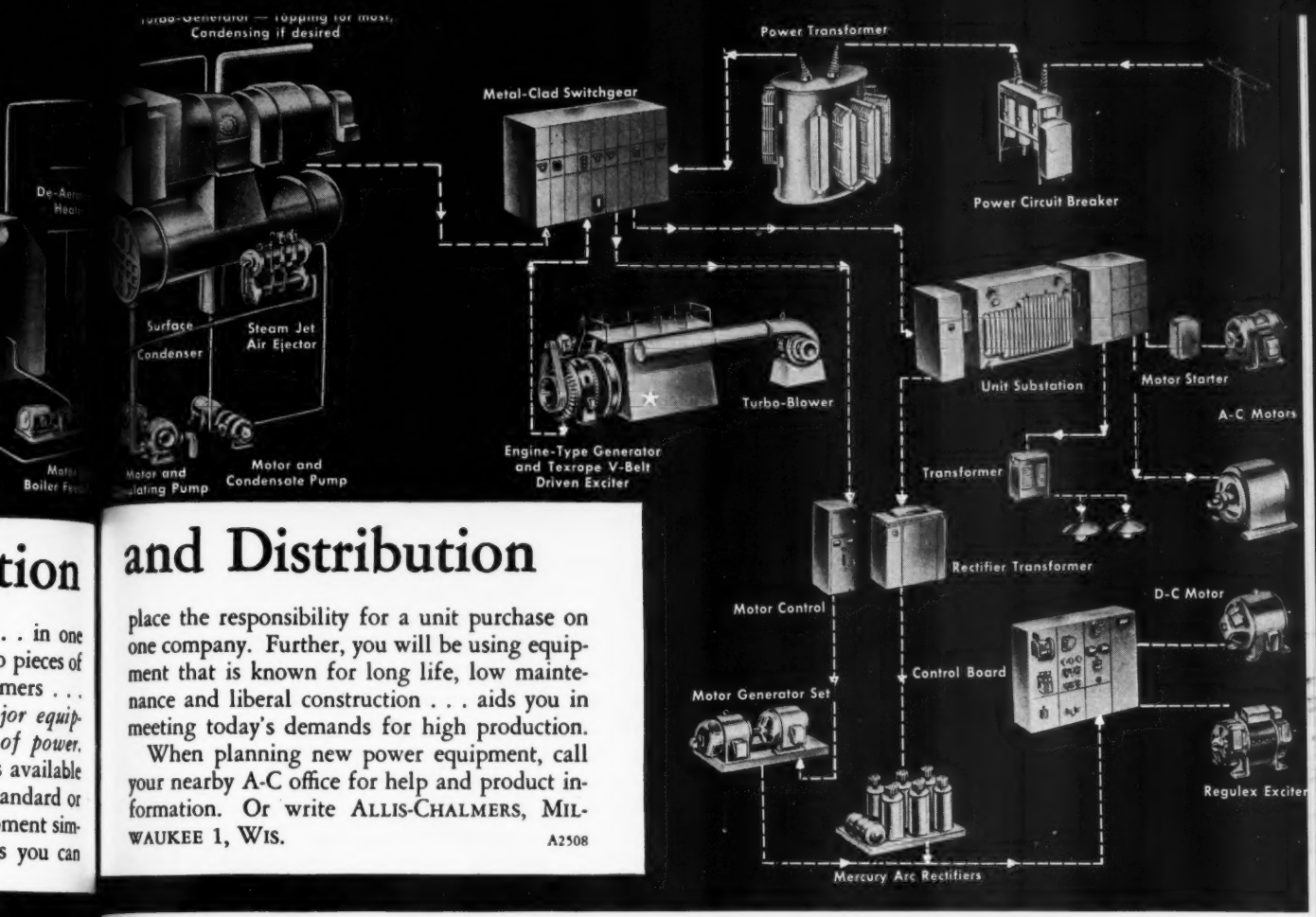


IN RATINGS TO 2,000 HP AND HIGHER, Allis-Chalmers builds these totally enclosed fan-cooled motors for hazardous locations . . . in refineries and pipelines. Simple ventilation system with tube-type air-to-air heat exchangers is easy to clean. Designed for service in corrosive atmospheres and in localities where air-borne particles create a problem in ventilating open-type motors.

Texrope and *Regulex* are Allis-Chalmers trademarks.

ALLIS-

Power, Electrical, Processi

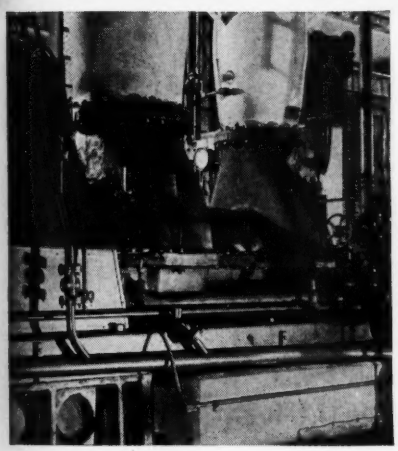


and Distribution

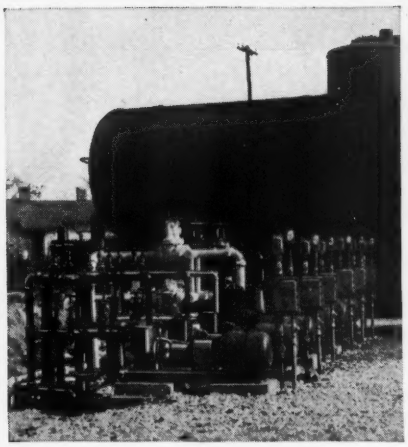
place the responsibility for a unit purchase on one company. Further, you will be using equipment that is known for long life, low maintenance and liberal construction . . . aids you in meeting today's demands for high production.

When planning new power equipment, call your nearby A-C office for help and product information. Or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

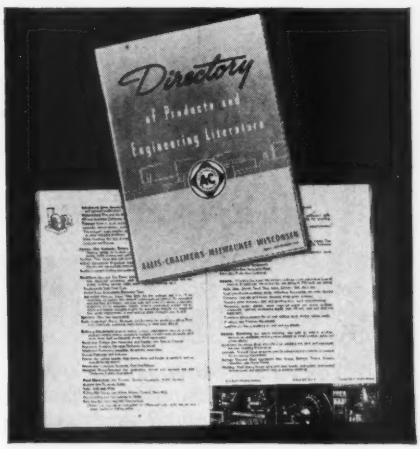
A2508



CENTRIFUGAL BLOWERS . . . ROTARY COMPRESSORS . . . vacuum pumps are available in a wide range of types and sizes. Drives include motors, steam turbines, gas turbines—A-C is the *only* U. S. company to furnish gas turbine-axial compressor units for the Houdry process.



FOR PUMPING GASOLINE, WATER and other liquids, A-C can supply pumps in many types and sizes. Included is the Self-Priming unit, popular for loading and unloading tank cars, barges, etc. because it maintains pumping action even when slugs of air or gas are admitted.



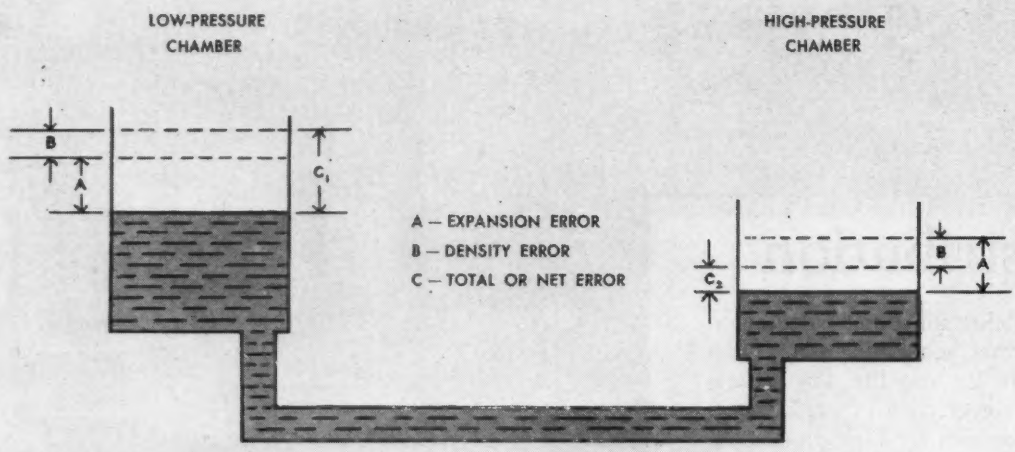
SEND FOR FREE BULLETINS! The "Directory of Products" lists all Allis-Chalmers products and literature. Send for your copy . . . learn what A-C builds to help you maintain high production.

ALLIS-CHALMERS

and General Machinery for the Petroleum Industry

ALLIS-CHALMERS A-C MILWAUKEE

METER-MAKING STRATEGY LICKS TEMPERATURE ERRORS!



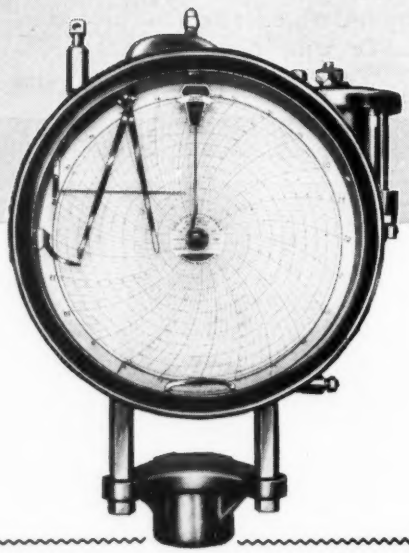
Schematic diagram showing two distinct error-factors (exaggerated for clarity) which enter differential flow meter operation with any increase in atmospheric temperature. The mercury-volume increases, tending to raise mercury level by the same increment (A) in both high- and low-pressure chambers. At the same time, mercury-density decreases, resulting in greater travel for a given differential. This tends to raise the level in low-pressure chamber and lower it in high-pressure chamber by equal amounts (B). Thus, if float is located in low-pressure chamber, expansion error (A) and density error (B) combine to form larger error (C_1). With float in high-pressure chamber, (A) and (B) are counteractive, leaving only negligible net error (C_2).

Foxboro Engineering disproves practice of locating float in low-pressure chamber

Every detail of a Foxboro Flow Meter illustrates why you get "more for your money" when you buy a unit that is systematically engineered, instead of put together on a basis of fixed habit.

Foxboro's "strategy" of locating the meter float in the high-pressure chamber, rather than the low-pressure, is one of many typical examples. Based on broader understanding of basic principles, this simple design feature utilizes two inherent sources of thermal error to offset each other. The result is sustained accuracy throughout the range, winter and summer alike!

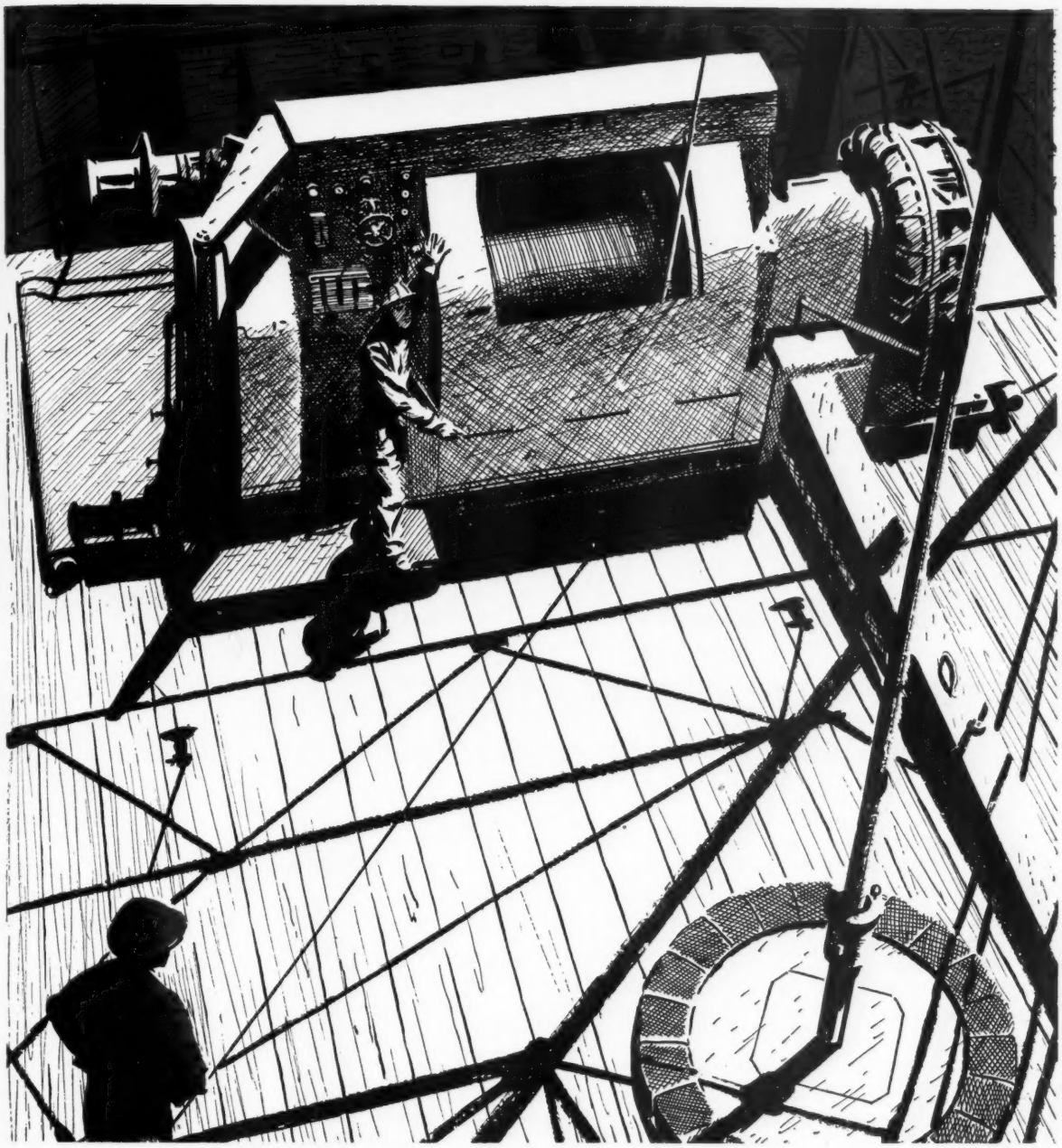
Even for your simple installations, it costs no more to get Foxboro Meters built with such exacting refinements throughout! Write for Bulletin 351 describing these money-saving meters. **The Foxboro Company, 104 Neponset Ave., Foxboro, Mass., U. S. A.** Branches in principal cities.



EXCLUSIVE FOXBORO REFINEMENTS

- **Segmental Lever Transmission gives straight-line calibration.**
- **Extra-large Float with long travel for extra power.**
- **Sure-Seal Check Valves positively prevent mercury losses due to overrange.**
- **Pressure-Tite Bearing eliminates stuffing box and packing.**

FOXBORO REG. U. S. PAT. OFF. **DIFFERENTIAL-TYPE FLOW METERS**



the MODERN command post for MODERN rigs

W·A·B enginaired controls . . . They concentrate immediate, precise command of all operations at driller's position.

. . . They give exact control of engine speeds, singly or compounded.

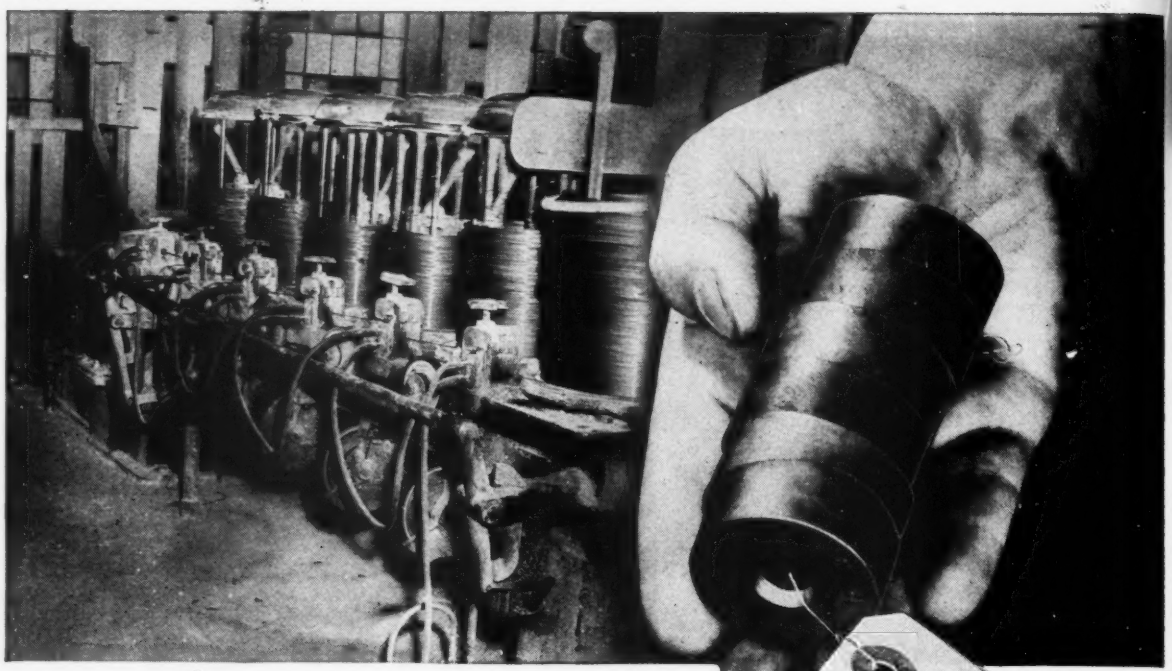
. . . They govern drilling functions by a finger-touch on small levers.

. . . They set new highs in simplicity, safety and efficiency of control.

Available on the newest rigs of most leading manufacturers.

WESTINGHOUSE AIR BRAKE COMPANY

INDUSTRIAL DIVISION: WILMERDING, PA.



Wickwire's wire drawing dies are accurate within .0003 of an inch.

In Rope Wire too—Reducing Methods Must be Safe

Making rope wire slim and strong is as scientific as any reducing method for humans—and a lot more certain of correct results. At the Wickwire plant, the size and sequence of wire drawing dies are carefully calibrated to provide for uniform reduction and to avoid the possibility of wire becoming brittle. Skipping of drafts, another cause of wire embrittlement, is eliminated by use of continuous wire drawing machines which will not function unless all dies are in their proper place.

Drawing, cleaning, heat treatment—every step necessary to reduce Wickwire Rope Wire to final size is closely supervised. The finished wire is accurate within a fraction of a thousandth of an inch. Production of strands and finished ropes is equally exacting.

All this adds up to Wickwire Rope being the logical choice of rope users who demand the utmost in performance, safety and long life. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed. Wickwire Distributors and Rope Engineers are always ready to help solve your wire rope problems and supply the right rope for your needs.

HOW TO REDUCE ROPE COSTS AND PROLONG ROPE LIFE

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.

WICKWIRE ROPE

CF&I & SUBSIDIARIES

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass. **EXECUTIVE OFFICE**—500 Fifth Avenue, New York 18, N. Y.

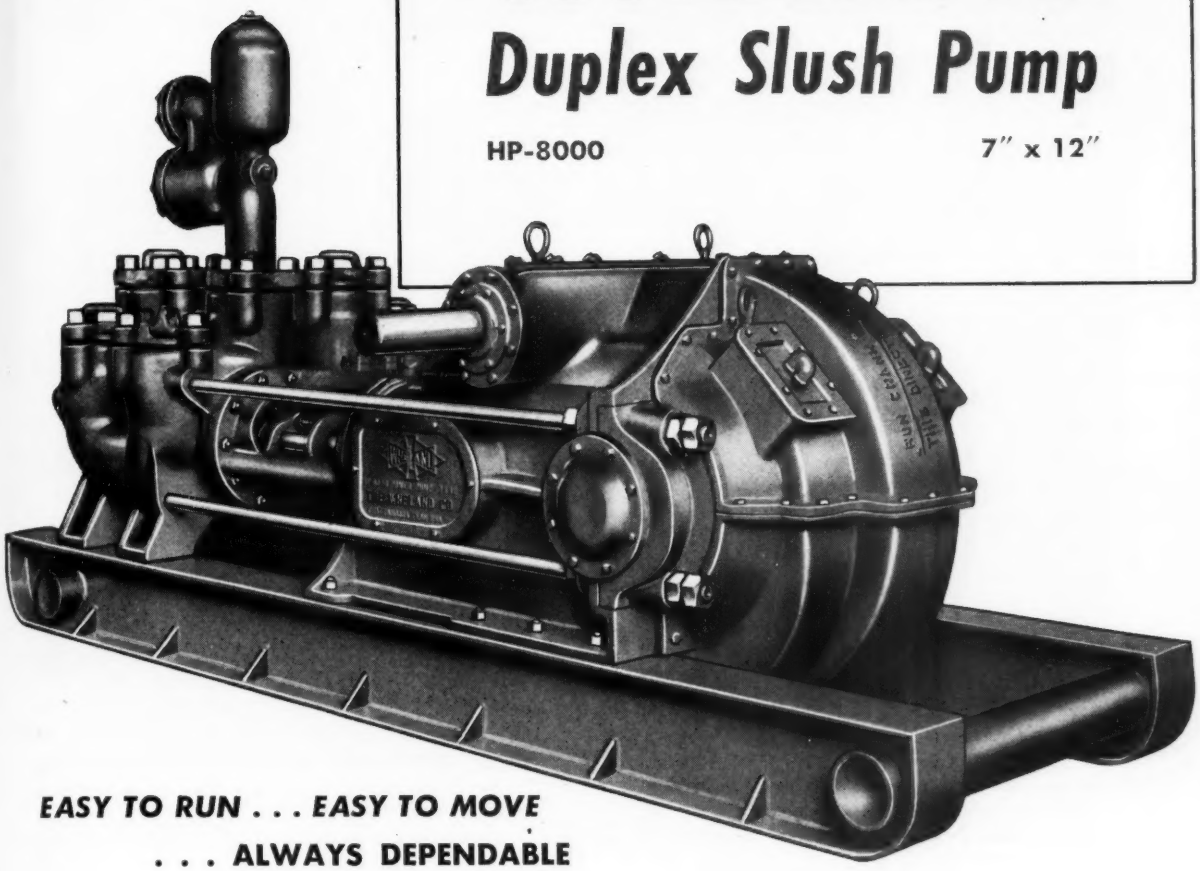
SALES OFFICES—Abilene (Tex.) • Boston • Buffalo • Chattanooga • Chicago • Denver • Detroit • Emlenton (Pa.) • Fort Worth • Houston • New York • Philadelphia • Tulsa

PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

THE MOST ACCESSIBLE PUMP EVER BUILT!

WHELAND
Duplex Slush Pump

HP-8000 **7" x 12"**



EASY TO RUN . . . EASY TO MOVE . . . ALWAYS DEPENDABLE

The tie-rod construction on the Wheland HP-8000 pump gives strength without weight—strength where the load comes. Two separate nationally known engineering organizations studied this pump with a view to streamlining its appearance. After careful study, both organizations reported that the tie-rod construction had outstanding advantages in strength without weight and that this construction makes it easy to get to any part of the pump for inspection, adjustment or repair.

In the oil fields we hear such comments as: "It's got a real strong back" and "It's the biggest little pump on the market."

Bulletin No. 170 gives Mechanical details. A copy will be sent on request. If you study these details you will see why this pump is easy to run, easy to move and ALWAYS DEPENDABLE.

DOMESTIC DISTRIBUTORS
Jones & Laughlin Supply Co.
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DESIGNED SPECIFICALLY TO ELIMINATE OPEN HOLE HAZARDS IN DEEP WELLS

O·C·T

1 AS SHIPPED from O-C-T, "C-19" Casing Hanger is assembled ready to install from derrick floor. Lock screws are in place to hold slips at top position and lifting handles are attached for convenient, safe movement by crew.

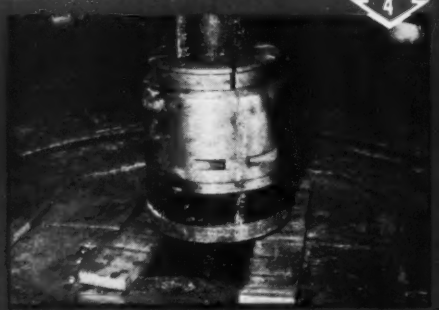
2 WITH HANGER LATCH OPEN, "C-19" is quickly and easily slipped around pipe. Slips are still safely retained by lock screws. Crew works in safe, comfortable position on derrick floor

O-C-T HAS READY FOR YOU A 20-PAGE HANDY REFERENCE FOR FLANGE DIMENSIONS, BASED ON API STANDARD 6B. WRITE FOR YOUR FREE COPY TODAY

3 WITH HANGER LOCKED IN PLACE, lock screws are easily and quickly removed from the slips.

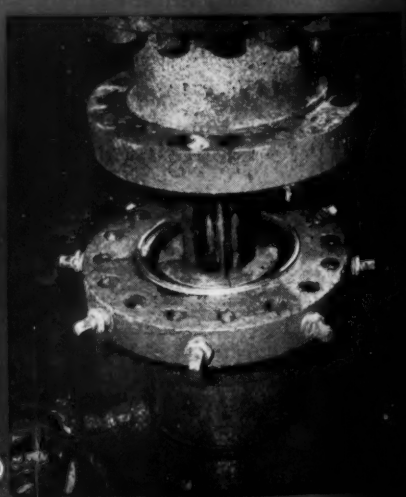
READY TO DROP through the rotary, the "C-19" Casing Hanger moves safely down around the pipe into position when boards are removed.

4



IN POSITION in the casing head body, the "C-19" has dropped smoothly through the preventers to safely seal the well before preventers are removed.

5



C-19 CASING HEADS

SET A NEW SAFETY STANDARD FOR CREWS AND RIGS

Designed for quick setting and positive sealing, O-C-T "C-19" Casing Heads mark a major advancement in well control equipment for deep or shallow wells.

The entire series of operations required to install the O-C-T "C-19" Casing Head . . . a series of safe operations that saves hours of costly rig time and protects your crews from cellar hazards . . . is conducted without leaving any romote possibility open at any time for your well to pressure up and blow out.

With the O-C-T "C-19" Casing Head, the well is closed in around the casing before ***blowout preventers are unflanged.*** The space between the strings is ***safely sealed*** so that blowouts cannot occur while the pipe is being cut off, the blowout preventers set aside and the next head installed. The seal is automatic when casing weight is applied. No manual work is required to apply sealing compression to the seal ring. Slips set evenly, automatically centering pipe, and slip tooth pressure is uniform from top to bottom and around the pipe. This perfect uniformity cannot be obtained with hand-installed slips.

With heads that require installing the slips and packoff after the preventer is picked up, ***blowouts can occur*** from a gas sand above the cement and below the surface pipe.

Crew safety, comfort and convenience are materially improved. Crews work with sure footing on the rotary table, rather than standing on slippery and muddy boards over I-beams on the derrick substructure.

Contrast and compare the safe, fast installation of O-C-T "C-19" Casing Heads as pictured here with the normally hazardous and slow method of men working under the blowout preventers to install slip suspension casing heads in the typically muddy and slippery cellar conditions.

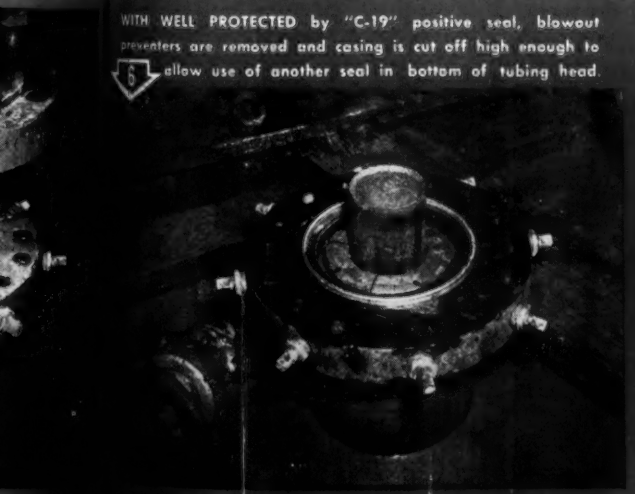
O-C-T "C-19" Casing Heads are the ***only slip type casing heads*** that give this protection to your well and crews. Write for complete details.

OIL CENTER TOOL COMPANY

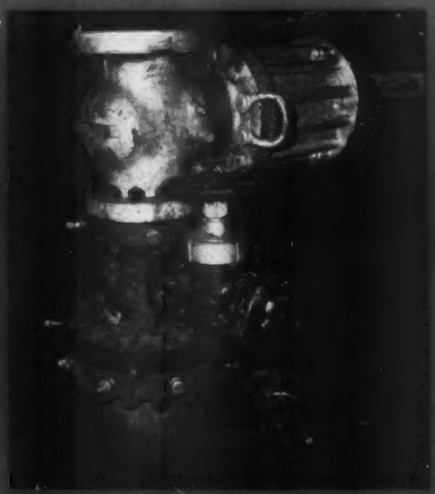
P. O. BOX 3091 HOUSTON, TEXAS

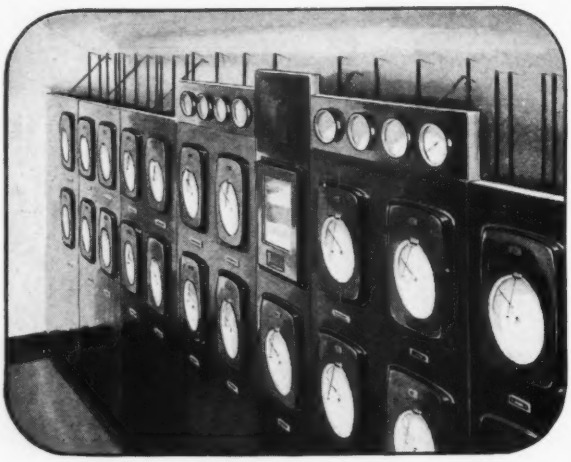
Export Representatives: Venezuela, Colombia, Peru and Ecuador: Berry & Hall, Apartado No. 304, Maracaibo, Venezuela. Address Export Inquiries for All Other Countries to: P. O. Box 3091, Houston 1, Texas.

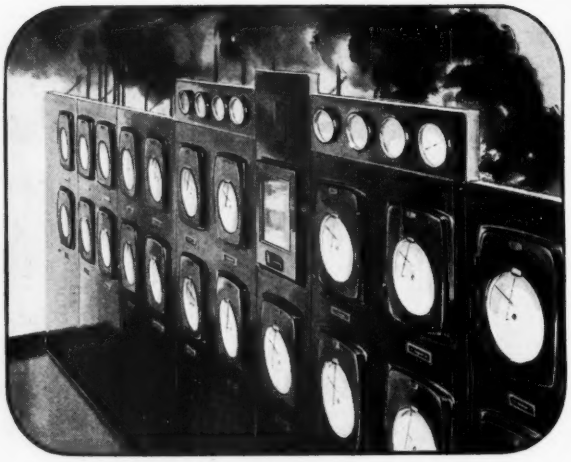
6 WITH WELL PROTECTED by "C-19" positive seal, blowout preventers are removed and casing is cut off high enough to allow use of another seal in bottom of tubing head.



7 READY TO COMPLETE WELL SAFELY —The "T-16-1" Tubing Head has been slipped over the top of the casing, the flange made up and I-seal screws tightened, providing a means of using the test port to test the seal between the I-bottom and the "C-19" Casing Hanger. 7" hydraulic operated drilling master gate has been installed. With blowout preventers attached above the master gate, the well is ready to perforate or drill out cement and complete the well.







Your control room, too— ***is a fire-danger spot—***

PROTECT IT

THE *Kidde* WAY!

Don't take chances with refinery fires—protect your control rooms as thoroughly as you protect your flammable liquid hazards!

A control room fire can be quickly extinguished—*before* it can spread—when you have a *Kidde** Total Flooding System on guard. A *Kidde* System quickly pours carbon dioxide (CO_2) into the entire room. The flames can be smothered in just a few seconds!

With a *Kidde* System, fire damage is kept to a minimum—and there's no other damage at all. The dry, clean, non-corrosive CO_2 cannot damage delicate apparatus or attack electrical insulation. It leaves the room free from after-fire mess.

Ask a Kidde representative about total Flooding Systems—engineered for *your* requirements.

*Also known as "LUX"

The words "Kidde" and "Lux" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Kidde

Walter Kidde & Company, Inc. • **1254 Main St., Belleville 9, N. J.**

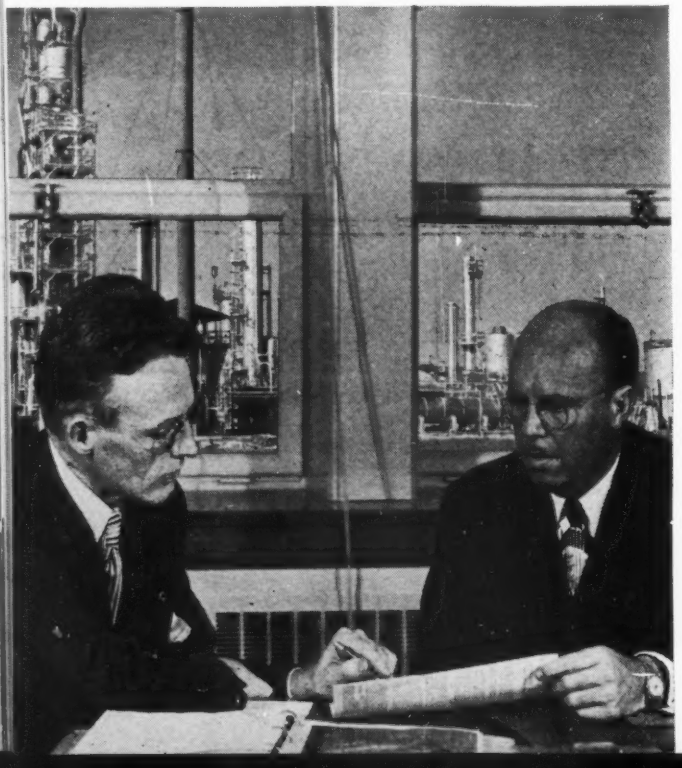
THE Preformed Challenge
Here's a CHALLENGE to the few who have not used Preformed Wire Rope:
•
Put Preformed to work on your job.
See for yourself if it isn't
• easier to install
• safer to use
• longer lasting
. . . and see if it doesn't
• COST LESS TO USE
That's the Preformed challenge

Ethyl Laboratories interpret engine trends

WHAT is likely to be the trend of engine design in the future? Will the fuels required by these future engines be radically different from present-day fuels?

These are just two of the many questions facing refiners at this critical period in the industry's history. Because changes in engine design almost always mean compensating changes in fuel properties, progressive refiners will want to be fully informed on possible engine developments and be ready to produce fuels of the required quality.

In order to help refiners keep abreast of the planning of automotive engineers so far as it relates to the fuel requirements of engines, it has been Ethyl's policy since its beginning over twenty-five years ago, to maintain close contact with the manufacturers of engines and to devote a substantial part of its research to extensive investigations of possible future engines. Ethyl engineers continuously study the performance of a wide variety of fuels in supercharged engines and in engines having compression ratios in the range expected to be in use in the period ahead. Every effort is made to relate the gasoline preferences of engines to fuel-hydocarbon types available from petroleum refining processors.



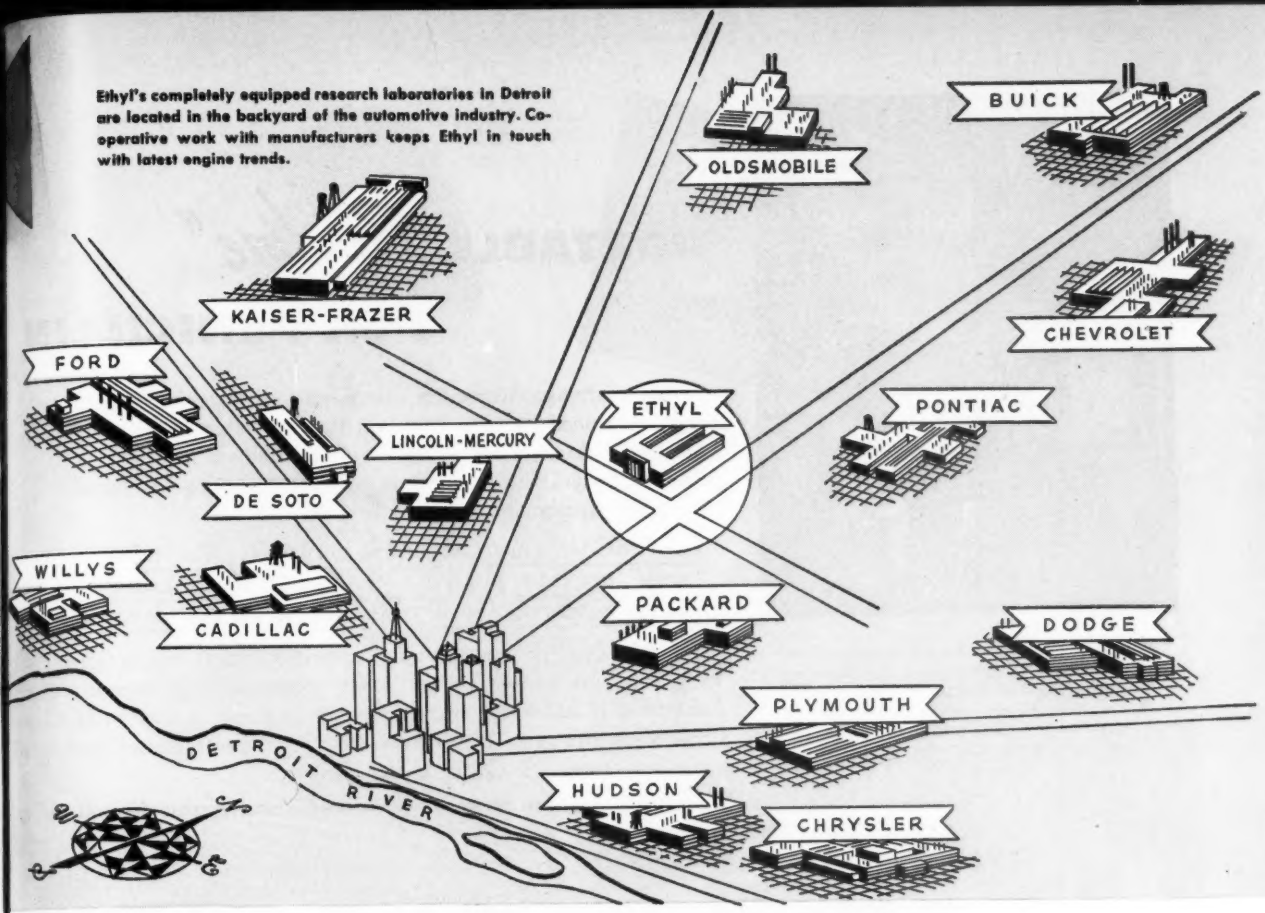
One of Ethyl's Laboratory Contact Representatives, R. B. Sneed, with background knowledge gained from many research projects, visits the modern plant of the Leonard Refineries, Inc., at Alma, Michigan. He consults with Vice-President John S. Pfarr (right), and offers help in interpreting engine developments and their effects on future fuel requirements.

Fitting fuels to future engines

A study of fuels in road vehicles recently completed by Ethyl Research Laboratories shows how a gasoline may be blended to meet, in the most economical way, the antiknock requirement of a future engine.

The chart shows the road octane number—over a range of speeds—for three types of fuels: A—unsaturated, B—saturated, C—selectively blended. Curves are plotted from road ratings obtained on an experimental valve-in-head engine of 8 to 1 compression ratio. Octane requirement of the engine is shown as a broken line.

Fuel A, at low speed, has an octane number six units higher than the engine needs, but just meets the requirement at high speed. On the other hand, Fuel B, at high speed, has an octane number twelve units higher than the engine requirement but has no excess of antiknock quality at low speed. Selectively blended Fuel C, in contrast to both fuels A and B, satisfies the engine requirement curve over the entire speed range with virtually no waste of antiknock quality.

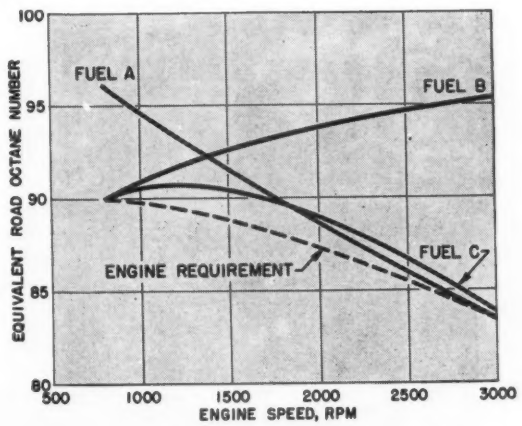


Ethyl's completely equipped research laboratories in Detroit are located in the backyard of the automotive industry. Co-operative work with manufacturers keeps Ethyl in touch with latest engine trends.

Research of this type is just one of Ethyl's services to refiners. The over-all objective of this service is to assist oil companies in their efforts to make satisfactory fuels for future engines at tne lowest cost and to obtain the maximum value from each drop of "Ethyl" brand of antiknock compound.

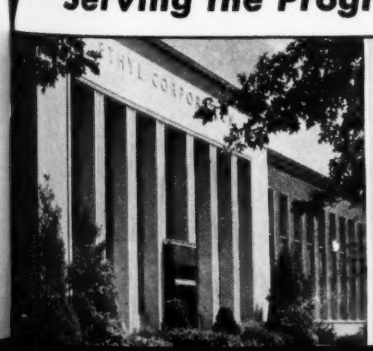
The strategic location of the main research laboratories of the Ethyl Corporation at Detroit makes possible close relationships with automotive engineers. These relationships assist materially in the formulation of research programs designed for the benefit of oil companies.

This message is the ninth in a series dealing with problems faced by refiners in producing gasoline for today's and tomorrow's engines, and the contribution of the Ethyl Corporation to their solution. Future messages will discuss other phases of this complex problem.



Road antiknock performance of three types of fuels in an experimental high-compression engine.

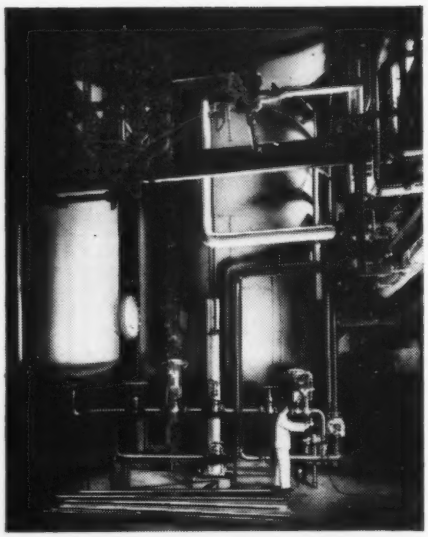
Serving the Progressive Petroleum Industry Through Research



ETHYL CORPORATION

RESEARCH LABORATORIES

1600 WEST EIGHT MILE ROAD, DETROIT, MICHIGAN
2600 CAJON ROAD, SAN BERNARDINO, CALIFORNIA



An actual photograph of one of a battery of 12,000-gallon fermentation tanks used in a modern Penicillin production plant. Many types of GMC trucks perform many different types of transport jobs for this concern.

PORTABLE *"Pipeline"* FOR PENICILLIN

A few years ago, Penicillin, the newest of "wonder" drugs, was produced in small quantities by slow laboratory methods. Today, it is being manufactured on a mass production basis in large capacity plants employing the latest scientific equipment.

The GMC truck with large twin-tank trailer, shown below, "pipes" penicillin broth . . . 3,400 gallons per load . . . between plants of a leading pharmaceutical manufacturer.

Here is a graphic example of how modern mass production schedules are geared to the speed, flexibility and dependability of motor truck transportation. And, no matter what the transport need in oil field work . . . just name your job . . . there's a GMC to do it!

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

ARSENICAL ADMIRALTY 439

today's standard, designed for long-life in refinery service

Amount of critical alloying elements is checked in the laboratory with the help of this grating-type spectograph.

Every Anaconda Condenser Tube must withstand the hydrostatic pressure test required by A.S.T.M. Specification B 111.

CONTAINING approximately 70% copper, 28.96% zinc, 1% tin and 0.04% arsenic, Arsenical Admiralty 439 is highly resistant to dezincification, general corrosion, attack by fresh, brackish or salt waters, sweet or sour crudes under pressures, velocities and temperatures normally encountered in refinery condensers and heat exchangers.

Several years of extensive research preceded the commercial production of Arsenical Admiralty Tubes which was begun in 1934. The consistently satisfactory performance of Arsenical Admiralty Tubes in crude and re-run stills, cracking and polymerization plants for the past 14 years has fully proved the effectiveness of arsenic as an inhibitor of dezincification and has fully substantiated laboratory test results.

TECHNICAL SERVICE AVAILABLE

It is a function of the engineers of our Technical Department to assist tube users in the selection of the most economical alloy for any given set of operating conditions. Feel free to call on us. Publication B-2, giving detailed information on Tubes and Tube Sheet Alloys mailed on request. 48141

ANACONDA
From mine to consumer

Anaconda

HEAT EXCHANGER TUBES

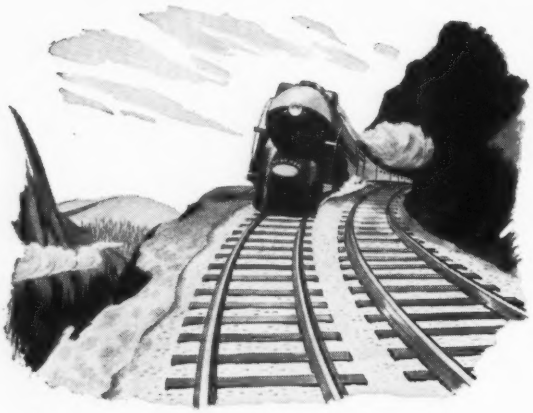
THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

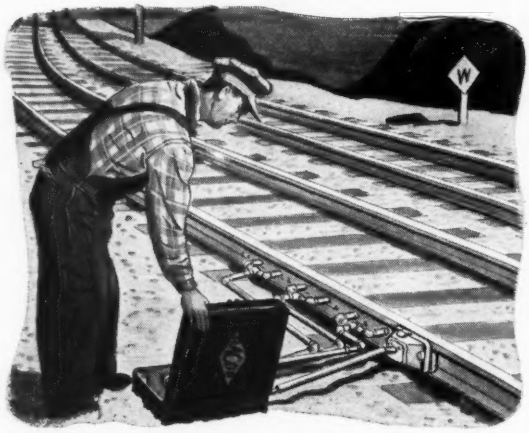
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

Let Morse grease the rails for your tough jobs too!



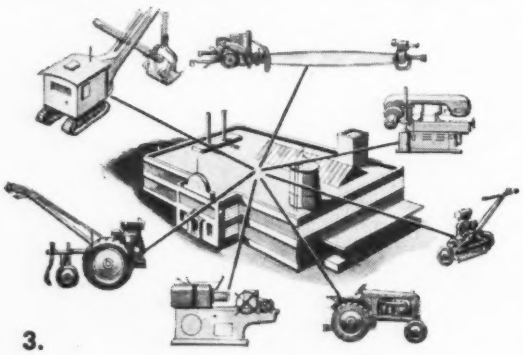
1.

Sc-r-r-ee-ch! Railroad men know this noise means that expensive train wheels and rails are wearing away on curves. To prevent this wear, automatic greasers were installed to lubricate wheels and rails. Old-style ratchet type clutches were tried, but slipped or didn't feed grease right. American Brake Shoe Company's Ramapo Ajax Division solved this knotty problem . . .



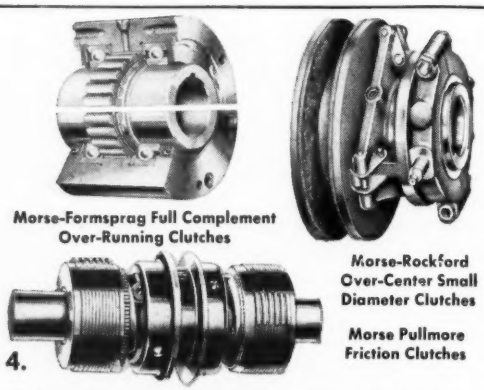
2.

They now use Morse-Formsprag Clutches. The positive action of Morse-Formsprag Clutches is far superior in performance, dependability and service over the old ratchet type. *M-F Clutches engage instantly; allow no back-slip; feed grease to every passing wheel.* Other complex operations on your products may call for Morse-Rockford Friction Clutches . . .



3.

Morse clutches fill almost every need you can imagine. Can the sales and mechanical value of your own products be enhanced by using Morse clutches? Leading manufacturers of such items as construction equipment, cultivators, saws, pumps, lawn mowers and machine tools have bettered *their* products with Morse clutches. How about you? Do this now . . .


Morse-Formsprag Full Complement Over-Running Clutches
Morse-Rockford Over-Center Small Diameter Clutches
Morse Pullmore Friction Clutches

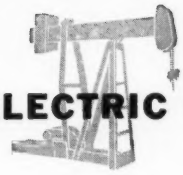
4.

Write for expert clutch engineering aid and consultation. For new ideas, send for clutch catalogs: Morse Formsprag Clutch Catalog, No. C11-48; Morse Pullmore Clutch Catalog, C31-47; Morse-Rockford Clutch Catalog, SDOC. Address: Morse Chain Company, Department 257, 7601 Central Avenue, Detroit 8, Michigan.

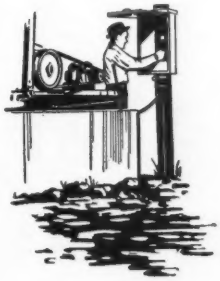
MORSE CHAIN COMPANY • DETROIT 8, MICHIGAN

BRANCH OFFICE AND WAREHOUSE, 1308 LA BRANCH, HOUSTON, TEXAS

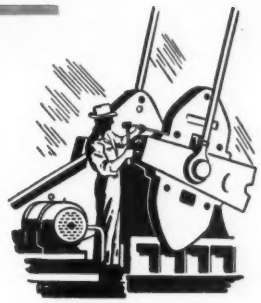
WHY GE ELECTRIC PUMPING CUTS RECOVERY COSTS:



"hot or cold... your pumps start for sure"



SIMPLE OPERATION. Pumpers with little experience can readily operate and look after an electrified pumping rig.



ACCURATE COUNTERBALANCING With an ammeter indicating the load, you quickly note the effect of changes in the counterbalance and adjust weights.

With a G-E electric well-pumping drive, you don't run up excessive production losses or maintenance costs caused by starting delays—no matter what the weather. Electric motors—with no water or gas lines to freeze up—need no babying or tuning up to start. They're protected against heat by air-cooling, against dust by sealed bearings, and against corrosion by cast-iron enclosures.

G-E pump controls, too, minimize any operating or maintenance problems. Time switch, magnetic starter, and protective devices—all are housed in a well-ventilated, weatherproof case. The starter can't overheat in the hot sun and prematurely kick the motor off the line. This eliminates extra trips to reset the overload relays, gives your pumper more time for other duties.

Dependable, all-weather starting is only *one* reason why G-E electric pump motors and control help you produce more oil at less cost. Let a G-E engineer give you the full story. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

HAVE YOU SEEN IT?

"Lease on the Future"

Ask your nearest G-E office to have this new sound and color film on oil-field electrification shown to your organization.

More Power to America

GENERAL ELECTRIC

654-76

ELECTRIFIED PUMPING

new accuracy in **gas measurement**

with

HAGAN RING BALANCE FLOW METERS

Natural gas today is a valuable product and—especially where large volumes are involved—buyer and seller want the most accurate measurement obtainable. That, of course, calls for Hagan Compensated Ring Balance Flow Meters.

Here's what these meters give you over uncompensated meters:

1. *Accurate measurement* over a wide range of flow.
2. *Automatic pressure compensation.* In conventional meters, a "correction factor" must be applied to the chart reading when pressure varies from that for which the orifice was calculated. In Hagan Ring Balance pressure compensated meters, the correction is automatic, and the chart reading *is* the compensated reading. (You can get an uncompensated reading also if desired, as well as a pressure record.)
3. *Temperature compensation,* in addition to or instead of pressure compensation can be provided. This also is automatic.

Still another feature obtainable with these meters is a built-in integrator, operative between 2% and 100% of chart reading which continuously totalizes the compensated flow. The integrator can be read at any time without opening the meter case.

The Ring Balance principle makes the addition of pressure and/or temperature compensation so simple that it is a *standard model in the Hagan Ring Balance line*—not a special "problem child."

Measurement of gas flow is only one of dozens of applications for these versatile meters in the petroleum industry. They are suitable for process control in refineries, for measurement of all sorts of liquids, including corrosive liquids which can be handled only with the greatest difficulty by other meters; as steam flow-air flow meters in boiler rooms; as heat exchange meters; as B.t.u. meters; and for many other purposes.

We will be glad to send you full information on these meters, especially in relation to specific problems in which you are interested. Just write to Hagan Corporation, Hagan Building, Pittsburgh 30, Pa., or fill out the coupon below.

Hagan Corporation
Ring Balance Meter Division
Hagan Building, Pittsburgh 30, Pa.

Please send full information on Hagan Ring Balance Flow Meters. I am particularly interested in the application described at the right.

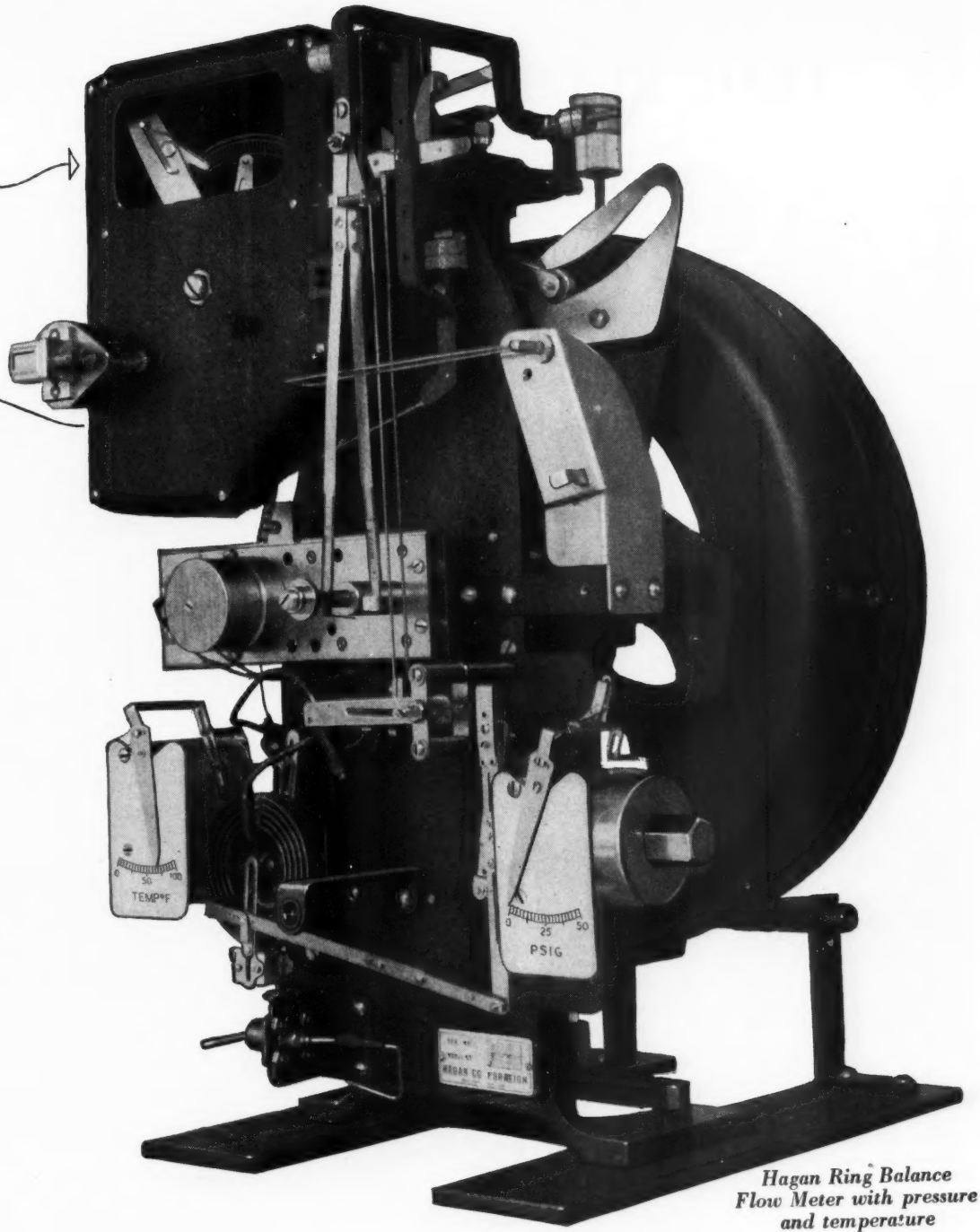
NAME

POSITION

COMPANY

STREET AND NUMBER

CITY AND STATE



Hagan Ring Balance Flow Meter with pressure and temperature compensation.

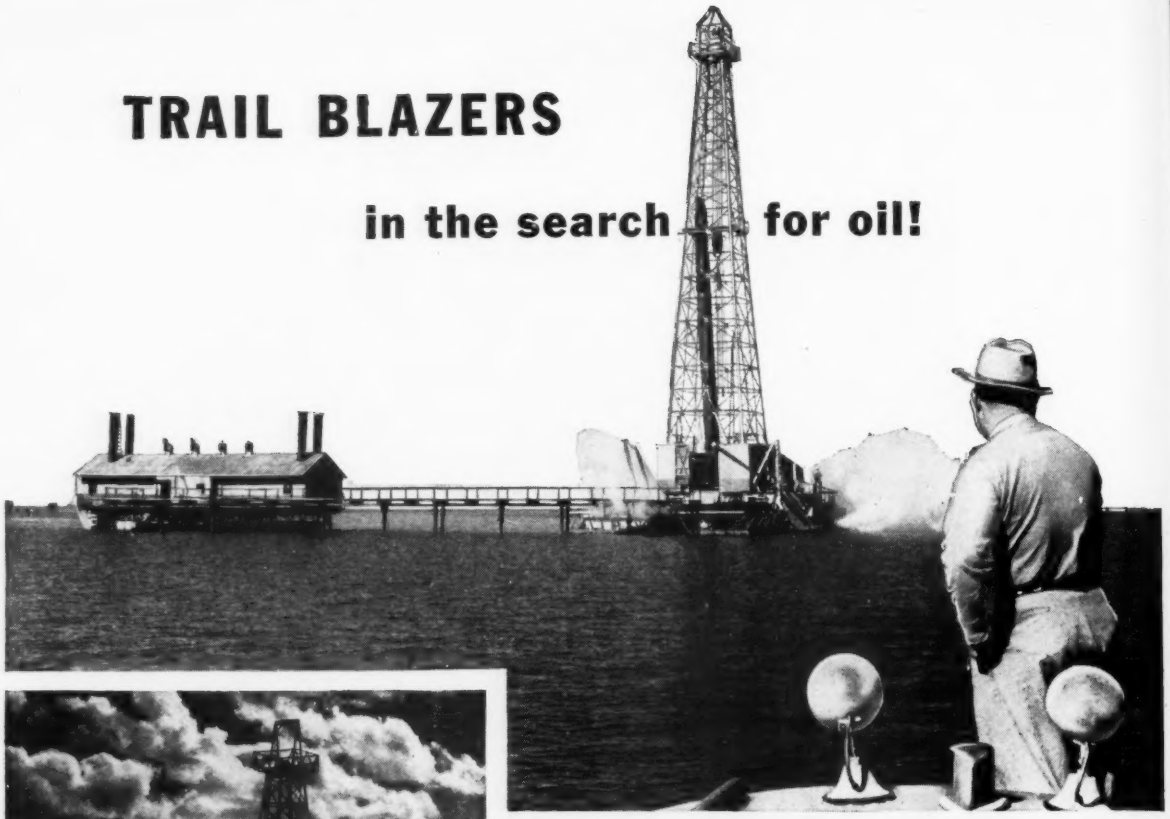
HAGAN CORPORATION

RING BALANCE FLOW AND PRESSURE INSTRUMENTS
THRUSTORQ FORCE MEASURING DEVICES
BOILER COMBUSTION CONTROL SYSTEMS
METALLURGICAL FURNACE CONTROL SYSTEMS

HAGAN HALL BUROMIN CALGON

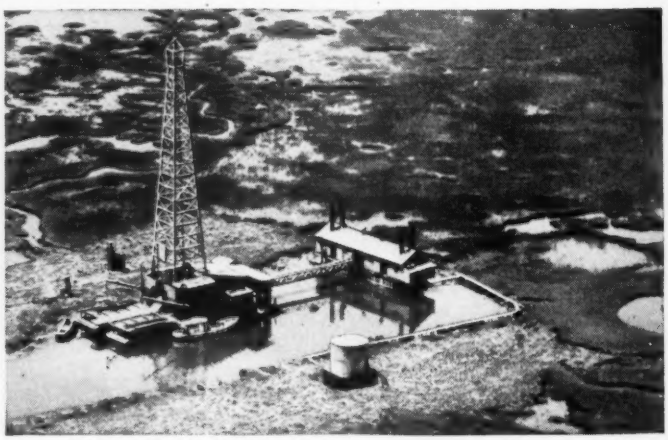
TRAIL BLAZERS

in the search for oil!



A submersible drilling barge on the Gulf Coast—this type of underwater drilling operation was developed by The Texas Company and adopted by the industry . . . another Texaco contribution to the vital search for oil.

Highest oil field in the U. S., with wells up to 8,378 feet above sea level, is at Wilson Creek, Colorado. Crude from this mountain field helps meet the demands of Texaco's far flung refineries.



One of the world's deepest producers, is Texaco's Lafourche Basin Levee, District No. 1 in the Queen Bess Island area in Louisiana. Total depth of this record breaker is 15,523 feet. Texaco stands near the top of the list of companies engaged in deep drilling.

To help meet the growing need for oil, The Texas Company is boosting exploratory work . . . building new research facilities . . . supporting expansion in synthetics . . . assisting in the development of foreign fields to reduce drain on U. S. crudes . . . and promoting consumer conservation.

THE TEXAS COMPANY

Petroleum Promotes Progress

TEXACO

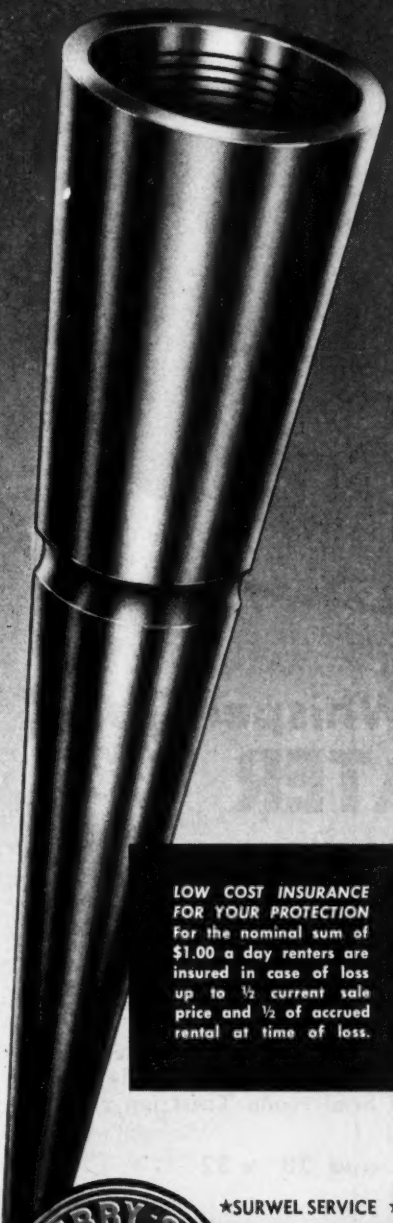
REG. T. M.

DIRECTIONAL SURVEYS

while you

DRILL

with S-S Non-Magnetic Drill Collar Rentals



Particularly advantageous in directional drilling the S-S NON-MAGNETIC DRILL COLLAR makes it possible to take directional single shot records *inside of the drill pipe*. It eliminates removing the drill pipe from the hole or raising the string off bottom to allow the surveying instrument to hang through a specially designed bit. You save rig time—You get more accurate records.

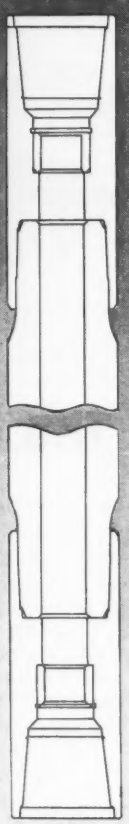
The S-S NON-MAGNETIC DRILL COLLAR is positioned immediately above the regular bit, the non-magnetic portion carrying the directional single shot instrument . . . *fully protected from loss and damage.*

Records are more accurate because the instrument is seated inside the drill collar in positive parallel to its walls.

The non-magnetic sections of S-S DRILL COLLARS are made of "K" Monel steel with the same high physical properties and strength found in conventional collars of steel.

S-S NON-MAGNETIC DRILL COLLARS are available on a low-cost daily rental basis in standard sizes from 4¾" x 14' to 7¾" x 23'.

Complete information and price list gladly furnished on request



Sectional view of S-S Non-Magnetic Drill Collar

LOW COST INSURANCE FOR YOUR PROTECTION
For the nominal sum of $1.00 a day renters are insured in case of loss up to ½ current sale price and ½ of accrued rental at time of loss.

★SURWEL SERVICE ★SYFO CLINOGRAPH ★E-C INCLINOMETER ★NON-MAGNETIC DRILL COLLAR

SPERRY-SUN

SPERRY-SUN WELL SURVEYING COMPANY

3118 BLODGETT AVENUE HOUSTON, TEXAS

Philadelphia, Pa. Falfurrias, Texas Odessa, Texas Marshall, Texas Long Beach, Calif. Oklahoma City, Okla.
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Here It Is!

The New JOHN ZINK "Whisper Quiet"
UNIT HEATER

"Famous For Heat"

The efficiency and quietness of this new John Zink Unit Heater is unexcelled. Its performance will convince you that it is the answer to your Unit Heater problems.

A larger volume of warm air is circulated to the floor level than actually passes through the heater at any one interval. This provides greater efficiency from the streamlined design of the heater and its high outlet velocity produces greater diffusion of air.

Burns natural, mixed, manufactured or L-P gases satisfactorily. Complete with fully automatic controls. 16″ four-blade fan. Adjustable louvers. Burner is easily accessible. Unit installed requires but a minimum of head room. Toast tan crinkle finish.

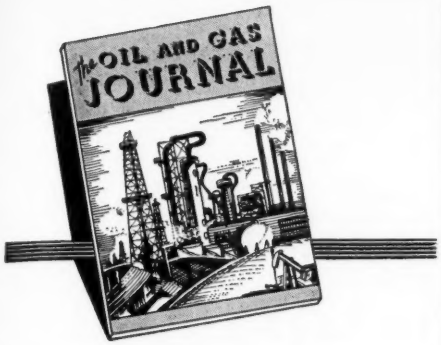
Two Sizes Available — 20″ x 48″ and 20″ x 32″

Write for literature

JOHN ZINK COMPANY

4401 S. PEORIA **TULSA 1, OKLAHOMA**

New York • Los Angeles • Salt Lake City • Houston



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JOURNALLY Speaking

Dear Editor

IN some publications the "Letters to the Editor" column is better reading than the rest of the magazine. This is seldom true of a business magazine.

Several reasons might be conjured up to account for this. We could, of course, suggest that the excellence of our editorial content defies competition from amateur contributors. In some cases these letter columns are pretty well filled by hawk-eyed readers correcting mistakes made by the editors, and on this point we remain discreetly silent.

It can't be that readers of business publications, including our favorite oil paper, have fewer opinions, gripes, and comments than subscribers to general magazines. Maybe they are all too busy to write letters, but we suspect the chief reason may be that a good many of them are afraid of getting in dutch with their superiors or their customers by sticking out their necks on some controversial issue or popping off with a personal opinion.

That being the case, we hereby take a newspaperman's vow on a stack of dictionaries never, even under threat of physical torture or cancellation of a subscription, to reveal the writer of a letter who asks that his name be kept in confidence. Any such who are itching to get their views into print can feel safe in unburdening themselves on our editorial shoulder, and no names mentioned. And if we think these views would be of interest to other oil men we will print same, or pertinent excerpts thereof, with complete anonymity.

Inching Onward

A SERIOUS problem in nomenclature appears to be confronting the pipe-line industry. What are they going to call those big new lines being planned?

When a 24-in. crude line was built to the East Coast during the war the public promptly dubbed it the "Big Inch"; not a big-inch line, which had been the pipe liners' generic term for any conduit of sizable cross section, but THE Big Inch.

Later a 30-in. gas line was laid across California and the Californians—as might be expected—christened it the Biggest Inch.

Now, we learn from the pages of our favorite oil publication, a 34-in. gas line is being planned. Since this also will be in California it is reasonable to assume that the Hollywood terminology will apply and this will be dubbed the Colossal Inch.

But we also understand that a 36-in. line is planned for the Middle East and that even bigger ones are a gleam in some pipe liner's eye. There would seem to be no limit if the titles hold out.

To prevent the tide of technological advancement being stopped by the wall of terminological insufficiency, we consulted our dog-eared Thesaurus and can offer these suggested names for future pipe lines: Stupendous Inch, Mammoth Inch, Whopping Inch, Elephantine Inch, and Behemothian Inch.

After that we suggest that the unit of measurement be changed and the series started over, with Big Yard, Biggest Yard, etc.

Long-Range Forecast

A DANISH scientist advances the theory that the gradual warming of the earth's climate during the past couple of generations, which he states as an accepted fact, is caused by burning so much coal and oil. It's not that these fuels warm things up but that they give off carbon dioxide which lies close to the earth and absorbs heat from the sun.

Since 1881, he calculates, the carbon dioxide content of the atmosphere has increased one-quarter of 1 per cent a year, and this will increase as more fuel is burned. Even with doubled consumption, he figures the world's mineral fuels will last at least 4,000 years, and by that time the atmosphere will be as warm and steamy as it was in the carboniferous era when giant ferns formed today's coal and oil.

So, with the climate getting warmer and Mother Nature at work making another batch of coal and oil, why worry about a fuel shortage?

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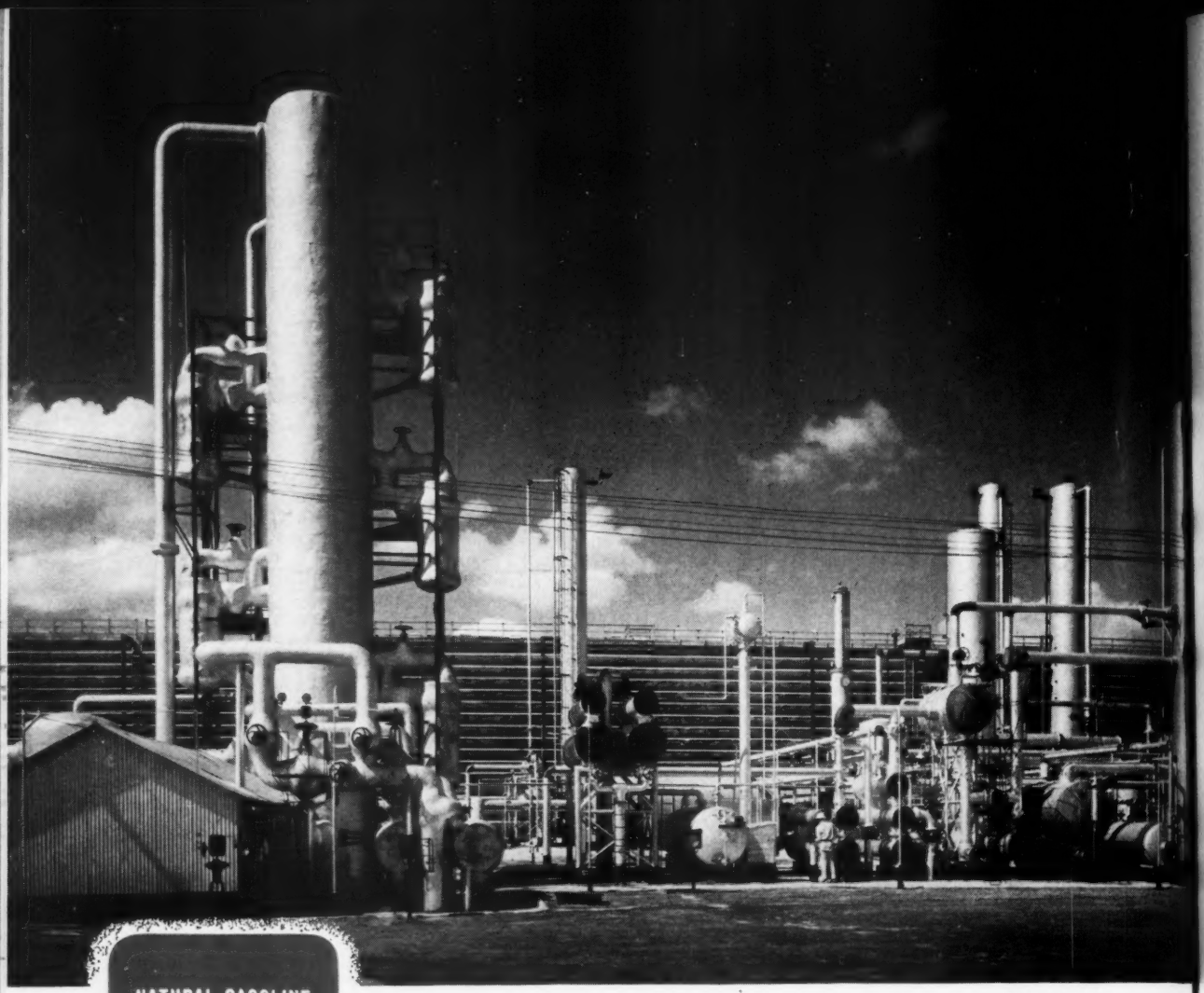

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Crude Oil, Natural Gasoline and Liquefied Petroleum Products

THE OIL AND GAS JOURNAL

Normalcy In Refining

IN the words of one veteran operator, "normalcy is returning in refining." By that he meant the wide margins as reflected in published quotations for finished products are coming to an end and operators are again faced with the necessity of maintaining balanced operations which will assure a reasonable return on investments in refining facilities.

Refiners as a group were fortunate in that when prices were frozen during the war period the price relationships between crude oil and products left a satisfactory margin for plant operations. This followed the lean decade of the thirties in which returns at most plants were inadequate.

The postwar wide spreads reflected a situation in which a few refiners selling largely on the open market were able to dispose of their plant output at what amounted to premiums over the prices generally prevailing in the movement of products. Most products are sold on long-time contracts with jobbers and through company-owned wholesale and retail facilities.

It is the history of petroleum markets, however, that the open-market sales, usually representing only a small part of the total, do determine over a period of time price trends in contractual arrangements both up and down. Had the top spot-market prices which became effective the early part of the year continued they would have established generally higher levels for all petroleum markets including crude oil.

Changes in supply and demand applying to most products and geographical areas have brought an end to the top quotations of 6 months ago with smaller declines in the minimums. This has resulted in a substantial reduction in refinery revenue to those who had been able to dispose most of their plant output at the top of the spot market. For example, if the highs of the product markets sold on a basis of Oklahoma (Group 3) are compared with present highs there is an indicated reduction in refinery revenue of about 85 cents per barrel.

A more representative comparison would be based on the averages in quotations. Assuming yields of 50 per cent gasoline, 5 per cent kerosine, 24 per cent distillate, 20 per cent residual oil, and a small plant yield loss, the decrease in refinery revenue in recent months has been in the order of 50 cents per barrel.

The conclusions are apparent. Granted that refinery margins have been relatively high, they are being reduced, and as every operator with 10 or more years of experience knows they can sink to nonprofitable levels quickly. In line with other divisions of the petroleum industry, refinery costs have greatly increased—possibly more than some operators realize.

Wartime and postwar yardsticks are over in refinery operations and the normal rules need to be applied now.

State Regulation of Natural Gas And Tidelands Urged on Compact

by Henry D. Ralph

WICHITA.—The progress made by the oil and gas-producing states, working together to effect wise and efficient conservation, is evidence enough that the problem properly rests in the cooperative hands of the sovereign states, and these states can, with a clear conscience, take a strong stand against infiltration of federal control.

This declaration in the opening address of Gov. Frank Carlson of Kansas set the theme for the winter meeting of the Interstate Oil Compact Commission here December 9-11.

The conservation of natural gas, its political or engineering aspects, was the topic of nearly every one of the papers presented, and the official representatives of the state regulatory bodies were one in the view that no federal control is needed to achieve this objective.

Two other subjects on the program were of special interest to the state delegates and the large number of oil-industry men in attendance. One was a description of the current lease play and drilling activity in Alberta, Canada, and the development plans and regulations of that province, presented by N. E. Tanner, Minister of Lands and Mines of Alberta.

The other was a special report on the tidelands situation by Gov. Beauford H. Jester of Texas, chairman of the Compact Commission, which was optimistic over the prospect of congressional legislation perpetuating state ownership and control of the production of oil and gas from offshore and submerged lands.

Among the several committee reports, greatest interest centered in that of the economics advisory committee which announced that the industry can meet all demands for petroleum products during 1949 and need not build up working stocks further. *(See separate story on opposite page).*

The legal committee, which had been working on a draft of a national oil policy, recommended that the subject be dropped on the ground that it is outside the duties and jurisdiction of the commission. The committee further recommended that the commission withdraw its 1941 action endorsing the national oil policy statement of the Independent Petroleum Association of America, but the report was referred to the executive committee for further study after it was suggested that the commission might be displaying instability by such action.

The legal committee also asked further time to complete a draft of a proposed uniform state oil and gas conservation statute, promising to have this completed by the next meeting of the Compact Commission.

Governor Carlson was elected chairman of the commission for 1949. Don T. Andrus, official representative of Pennsylvania, was elected first vice chairman, and James McClure, chairman of the Mississippi Oil and Gas Board, was made second vice chairman.

The commission accepted the invitation of the governor of Florida to hold its spring meeting in that state, the date and location to be selected later.

The delegates were flattered and intrigued by the request of the Minister of Lands for the Province of Alberta to become an associate member of the commission and to be host to one of its meetings, but problems of legality and practicability of making the compact international were postponed for later consideration.

In his opening address Governor Carlson traced the legal and legislative difficulties in protecting correlative rights but said this has now taken its place beside prevention of physical waste among the paramount duties of conservation bodies.

"It is now legally possible to prevent waste and to protect the owners of gas properties against drainage," he said. "Unscientific and incomplete proration formulas can result in depriving landowners of many thousands of dollars of revenue rightfully due them. We are proud of the proration record which has been made in this state. Proration methods which were first made effective in Kansas have now been adopted, with some slight modifications, by several of the other oil and gas-producing states."

Severe criticism of the purchasing practices of natural-gas companies was made by the Kansas executive, who threatened court or legislative

(Continued on page 153)

A luncheon given by the Independent Petroleum Association of America on the opening day of the meeting of the Interstate Oil Compact Commission in Wichita had these men at the speakers' table: (seated) Earl Foster, executive secretary of the Compact Commission; George Bruce, Wichita, I.P.A.A. vice president for Kansas; Fred Shield, San Antonio, new president of I.P.A.A.; E. C. Moriarty, Wichita, toastmaster; Harold B. Fell, Ardmore, executive vice president of I.P.A.A.; (standing) J. A. Aylward, Wichita; E. B. Shawver, Wichita; Rep. Herbert A. Meyer of Kansas; T. A. Morgan, director of conservation of Kansas Corporation Commission; Rep. Ross Rizley of Oklahoma; and William Bird, Wichita

Industry Can Meet All Demands For Oil in 1949, I.O.C.C. Is Told

WICHITA.—The petroleum industry is in position to meet total demands during 1949, it was declared unequivocally by the economics advisory committee in making its report to the Interstate Oil Compact Commission.

This optimistic forecast, the first such in several years, was greeted with applause and with a warning.

The warning came from Harold B. Fell, vice chairman of the supply and demand committee of the Independent Petroleum Association of America. The I.P.A.A. committee forecast higher demand and lower imports than the figures of the compact commission's committee, and Fell declared that if the lower demand and the higher import estimates are borne out the result will be an excess of crude production which will mean either an excessive accumulation of above-ground stocks or a cutback in domestic output.

Producers Will Protest Cut Back

Reminding the meeting that the industry's national oil policy, as stated at the close of the war by the Petroleum Industry War Council, called for importing only sufficient crude to meet demands above the capacity of domestic fields, Fell left the implication that domestic producers will make a vigorous protest if their output is cut back because of an oversupply caused by imports.

The report of the economics advisory committee was made to the I.O.C.C. by Albert J. McIntosh of Socony-Vacuum Oil Co., Inc., in the absence of Chairman Richard J. Gonzalez of Humble Oil & Refining Co. He reported that there appears to have been some slackening in the rapid growth of demand and that the rate of growth of increased supply is now greater than the rate of growth in demand.

An important conclusion of the report is that adequate working stocks have been established and there is no necessity to increase over-all stocks during 1949. Therefore the portion of the supply which has been going into building up stocks can be used directly for current demands. Since an average of 230,000 bbl. per day was used for this purpose during 1948 and the total increase in demand during 1949 is estimated at 350,000 bbl. per day, the increased supply required will be only 120,000 bbl. per day, of which 5,000 bbl. per day can safely be withdrawn for stocks.

The committee's forecast is given in the accompanying table. The total United States domestic and export demands during 1949 were estimated to exceed 1948 as follows:

	Thousand bbl. daily	Per cent
Gasoline	166	7
Kerosine	35	11
Distillate	115	12
Residual	3	...
Others	37	4
Total	350	6

In commenting on this forecast, the committee said, in part:

"The supply of all oils, domestic and foreign, required to meet the anticipated demand of 6,500,000 bbl. during the entire year of 1949 will be somewhat less than is being supplied in the fourth quarter of 1948. The required supply during the first quarter of 1949 is about 190,000 bbl. a day below current levels. The committee has assumed imports to be approximately 545,000 bbl. daily during 1949. If this quantity of oil is received from foreign sources, and if demand and stock changes conform to the estimates included herein, domestic production of crude and natural-gas liquids should average 5,550,000 bbl. daily and 420,000 bbl. daily, respectively."

The I.P.A.A. committee estimated that imports of only 440,000 bbl. per day will be needed during 1949. Pointing out that the current rate is approximately 500,000 bbl. per day its report said " a reduction in imports is indicated in order that imports may supplement rather than displace domestic output."

This group forecast total 1949 demand at 6,705,000 bbl. per day (8.1 per cent above 1948) and domestic demand at 6,370,000 bbl. per day (8.8 per cent above 1948), but Fell admitted that this may be on the high side. By products, this forecast estimated increases in domestic consumption of 8.8 per cent for gasoline, 11.1 per cent for kerosine, 16.3 per cent for light fuel oils, 2.1 per cent for heavy fuel oils, and 10.6 per cent for all other products.

This committee agreed that stocks are now at satisfactory levels, but allowed for an increase of 5,000 bbl. per day, chiefly in crude, during 1949. The total new supply, according to this estimate, will require a daily average during 1949 of 6,710,000 bbl., made up of 5,835,000 bbl. of domestic crude, 435,000 bbl. of natural-gas liquids, and 440,000 bbl. of imports.

Requirements for domestic crude, it stated, will be 5,725,000 bbl. per day during the first quarter of 1949, increasing to 5,940,000 bbl. per day by the fourth quarter.

U. S. PETROLEUM SITUATION
(Thousands barrels daily)

DEMAND—	1948 estimate 4th. Q.	1948 estimate Year	1949 projection 1st	1949 projection 2nd	1949 projection 3rd	1949 projection 4th	1949 projection Year
Gasoline	2,490	2,482	2,296	2,780	2,860	2,656	2,648
Kerosine	379	319	478	267	251	420	354
Distillate fuel oils	1,121	993	1,459	896	815	1,259	1,108
Residual fuel oils	1,430	1,412	1,534	1,334	1,285	1,484	1,409
Others	986	961	903	988	1,097	1,006	998
Total demand	6,406	6,167	6,670	6,265	6,308	6,825	6,517
Domestic demand	6,044	5,794	6,336	5,887	5,916	6,483	6,156
Assumed exports†	362	373	334	378	392	342	361
REQUIRED SUPPLY (To meet demand and stock change; not a forecast of availability)							
Natural-gas liquids	404	392	405	421	425	432	421
Assumed imports†	553	503	538	540	540	560	545
Required U. S. crude oil	5,635	5,502	5,460	5,524	5,594	5,604	5,546
Total required supply	6,592	6,397	6,403	6,485	6,559	6,596	6,512
STOCK CHANGES							
Four major products*	+77	+172	—378	+209	+316	—185	—8
Refinable crude oil	+126	+41	+111	—44	—43	—22	...
Others	—17	+17	.....	+55	—22	—22	+3
All oils	+186	+230	—267	+220	+251	—229	—5
CLOSING STOCKS (million barrels)							
Four major products*	277.0	277.0	243.0	262.0	291.0	274.0	274.0
Refinable crude oil	240.0	240.0	250.0	246.0	242.0	240.0	240.0
Others	68.0	68.0	68.0	73.0	71.0	69.0	69.0
All oils	585.0	585.0	561.0	581.0	604.0	583.0	583.0
CRUDE RUNS to stills	5,650	5,545	5,510	5,723	5,781	5,793	5,702

*Includes California heavy crude oil. †The committee included imports and exeports at assumed rates based on the best information now available. The quantities included for the breakdown of supplies between domestic and foreign sources do not constitute a committee recommendation.

Texas Operators Gain Permanent Injunctions for Two Oil Fields

by Leigh S. McCaslin, Jr.

HOUSTON. — Oil operators have gained permanent injunctions in cases involving 2 of the 15 oil fields which the Railroad Commission is attempting to shut down for alleged wasting of casing-head gas. The state, in turn, has appealed these two cases to higher courts—one to the state Supreme Court and the other to the Third Court of Civil Appeals in Austin.

Meanwhile, attorneys for Humble Oil & Refining Co. and the Attorney General's department asked for and obtained an indefinite postponement on the hearing on a permanent injunction against the commission's order for Tijerina - Canales - Blucher field, Jim Wells County. The postponement was asked so it could be seen what would result from the two cases appealed to higher courts. It is felt that the 15 other suits pertaining to 23 oil fields will also be postponed for the same reason. Temporary injunctions have been previously granted against the commission's orders for these 13 fields.

HOUSTON.—Operators in 26 Texas oil fields have been ordered to appear before the Railroad Commission January 25 to "show cause" why these fields should not be shut down because of alleged gas flaring. Fields involved are: East Texas, Imogene, Jourdanton, Lolita, Porter, Slick Wilcox, Francitas, Amelia, North Katy, Oyster Bayou, Red Fish Reef, Thompson, Thompson North, Thompson South, Conoco Driscoll, Odom, Richard King, Sun, Sun North, Chapel Hill, Navarro Crossing, Todd Deep, Todd Deep Crinoidal, Block 31 Devonian, Cowden South, and Fuhrman Mascho. In October, these 26 fields produced 13,187,580 bbl. of oil or a daily average of 425,395 bbl.

Permanent Injunctions Granted

The first permanent injunction granted was for Heyser field, Calhoun and Victoria counties. This case has been appealed by the state directly to the Supreme Court in an effort to set aside the injunction. Sterling Oil & Refining Co. et al obtained the injunction in Ninety-eighth District Court in Austin. The state asked the Supreme Court to advance the case for prompt action. However, the operators obtained a postponement of the case until January 12 in order to prepare briefs. The state appealed directly to the Supreme Court on the basis that only questions of law are involved in the case. It contends that the only question before the state's highest judicial body is the validity of the original order.

The second permanent injunction was granted in Ninety-eighth District Court to operators in Flour Bluff field, Nueces County. Attorneys for the state have announced that they will appeal this case to the Third Court of Civil Appeals rather than the Supreme Court.

E. O. Thompson, commission chairman, said he doesn't see why royalty owners and stockholders don't sue companies wasting gas for wasting their assets.

In the testimony which resulted in a postponement of the Tijerian-Canales-Blucher field case, attorneys for Humble detailed its plans to stop gas flaring in the field. The company announced that a compressor is being moved in temporarily to start reinjecting gas into the reservoir December 15. By February 15 it plans to have a new cycling plant completed. This will result in permanent full use of the gas of the field.

No other operators were involved in this case. The other operators have their wells connected to a compressor plant in Seeligson field. This plant is selling gas to Tennessee Gas Transmission Co.

Flour Bluff Similar to Heyser

The line of testimony and questioning in the Flour Bluff case, in which the operators gained a permanent injunction, was similar to the earlier Heyser field hearing. However, the state in its argument showed that there has been a gas transmission line in the field since the early 1940's. Humble did not make an agreement to sell residue gas to Houston Natural Gas Co., operators of the line, until last month, according to testimony.

Representatives of Flour Bluff Oil Co., Barnsdall Oil Co., and Humble testified that compressors are expected to be installed by next May to put gas into the pipe line serving the field. An engineer for one of the oil companies estimated that 275,000 bbl. of oil which never could be recovered would have been lost if the shutdown had become effective December 1 and lasted until next May. He further testified that such a shutdown would damage some wells to such an extent that they could never be restored to production.

The present flurry of court action is the result of 16 orders which the Railroad Commission issued November 23 to shut down fields producing around 400,000 bbl. of oil daily. The effective date of the orders was set as December 1. Temporary and permanent injunctions have now blocked the commission in 15 of the fields. In the sixteenth, a new order has been issued which allows the operators to produce less oil.

This sixteenth field is Foster in Ector County. The commission's second order reduced the field allowable from 25,347 bbl. daily to 20,278 bbl. It followed testimony by the operators that they could produce this amount without gas wastage. The allowable was reduced on a per-well basis by 20 per cent. In the order it was noted that 10 of the field's 650 wells are isolated and since it would be uneconomical for them to tie into gathering systems they would not be affected.

ECA Nations Get First Hand Study of Oil Needs

WASHINGTON. — Walter J. Levy, chief of the petroleum branch of the Economic Cooperation Administration, left Washington November 30 for an on-the-spot review with members of the Organization for European Economic Cooperation and other officials, of the petroleum-equipment needs of the Marshall-plan countries.

Although the equipment program has been under study for a year, the participating countries have not yet developed specific programs for expansion of their oil industries, and the original estimates, which Washington officials were convinced were unreasonably high, appear to have been scaled down but little by the OEEC.

ECA officials here are determined not to approve any programs which are more ambitious than conditions and outlook warrant, are nationalistic in character and do not mesh in with the needs of Europe as a whole, and contemplate shift to oil where other fuels are more readily available.

Levy expects to spend 2 to 3 weeks in Europe and hopes to pave the way for the writing of specific programs which can be included by the ECA in its estimates of the supplemental fund that will be required to keep the recovery program going during the final quarter of the current fiscal year and the sum that will be required for the coming year, which begins July 1.

this week

REGULATION—Interstate Oil Compact Commission devotes winter meeting to legal and engineering problems of natural-gas conservation. . . . Speakers point way to improved state regulation and denounce federal infringement. . . . Also hears prospects good for state control of submerged oil. . . . ¶Injunctions halt shutdown of Texas oil fields accused of gas waste pending court appeals. . . . But state initiates action in 25 more fields. . . . ¶State wins round in court battle to curtail gas production in Panhandle field. . . .

FORECASTS—I.O.C.C. economics advisory committee says industry can meet all demands for petroleum products during 1949. . . . With stocks now ample, only small increase in new supply needed. . . . ¶I.P.A.A. committee says that unless imports are cut there will be surplus of oil forcing curtailment of domestic production. . . . ¶Pogue tells congressional committee oil industry short of cash, must cut dividends. . . . But expansion period nearly over. . . .

TRENDS—Crude production in U. S. for week ended December 11 averaged 5,628,860 bbl. daily, up 14,670 bbl. over previous week. . . . Production has been above 5,600,000 bbl. daily since first reaching that mark in week ended October 30. . . . ¶Well completions total 833 for week ended December 11, a gain of 43 over previous week. . . . ¶Refinable crude stocks in U. S. show gain of 7,860,000 bbl. or 112,000 bbl. daily for period from September 25 to December 4. . . . Little change in stock level until September when upward climb began. . . . Increase in stock level augmented by California strike. . . . But increase continued with termination of strike. . . . Bulk of increase in stock levels due to crude from following areas—Rocky Mountain, 32,600 bbl. daily; Illinois-Indiana, 22,100 bbl. daily; foreign, 16,900 bbl. daily; Texas, 13,600 bbl. daily; and Oklahoma, 10,500 bbl. daily. . . . In California heavy crude was up 23,100 bbl. per day. . . . ¶Price cut in Pennsylvania Grade crude and the recent downward revisions of products prices reflect the general easing in market tone. . . .

INTERNATIONAL—Imperial president predicts Alberta crude will surpass local demand. . . . May be shipped to western Canada and U. S. . . . Imports from U. S. will be curtailed. . . . ¶Hungarian court gives Dr. Papp, former Jersey Standard manager death sentence. . . . Two other officials sentenced to prison. . . . Properties may be confiscated. . . . ¶U. S. denies charges of displaced Venezuelan president that American oil companies took part in his government's overthrow. . . . ¶Iraq asked to reopen Kirkuk-Haifa pipe line. . . . Government demanding higher royalty, assurances oil will not get into Israeli hands. . . .

PIPE LINES—Cities Service Gas Co. completes 182-mile 26-in. line at point near Hutchinson, Kans. . . . New section connects the Hugoton gas field with company's five-state system. . . . ¶Trans-Continental Gas Pipe Line scheduled to begin receiving pipe next month. . . . Construction to start in May. . . . Line will be the longest ever built as a single undertaking to extend from lower Rio Grande Valley to New York City. . . . ¶Contracts awarded by Shell Pipe Line for station construction on the Cushing, Okla.-Wood River, Ill., Ozark System. . . .

REFINING—A $19,000,000 expansion program by Gulf Oil Corp. at its Port Arthur, Tex., refinery has been completed. . . . New units add a potential 66,000 bbl. daily to plant's charging capacity. . . . ¶Continental Oil Co.'s $9,500,000 refinery at Billings, Mont., passes the half-way mark. . . . Completion expected in about 1 year. . . . ¶Gulf announces $40,000,000 expansion program for processing Kuwait oil at its Philadelphia refinery. . . .

Retiring after 50 years' service, Joseph Marsh, a machinist at the Bayonne refinery of Esso Standard Oil Co., gets an assist from brother Frank, a 36-year company veteran, as he leaves the plant for the last time. Holding the watch on Joe, who had a luncheon date with the board of directors, is brother-in-law Adolph Foeri (second from left) who retired last year after hitting the half-century service mark. Joe's son, Fred (extreme left), who started work at Bayonne 2 years ago, shares his father's pleasant prospect as fellow workers look on

Airplane view of Cities Service Gas Co.'s Ulysses, Kans., compressor plant facilities on the 400-mile, 26-in. line being built in 1948 and 1949 for transmitting gas from the Hugoton area to Kansas City. The 17,600-hp. Ulysses compressor plant went into operation this week for transmission through sections which have been already completed

New Cities Service Line Connects Hugoton Field to 5-State System

COMPLETION of a 182-mile 26-in. section connecting the Hugoton, Kansas, gas field with Cities Service Gas Co.'s five-state system, has been announced by S. B. Irelan, president.

The last section of pipe was welded December 14 at the Arkansas River crossing, near Hutchinson, Kans., to connect with the existing gas transportation network. The 17,600-hp. Ulysses compressor station was put in operation on December 15.

The 182-mile section extends from the new compressor, station 11 miles east of Ulysses, to Hutchinson, Kans. From there the new 26-in. line is being extended northeast 23 miles for a connection with a smaller line northwest of Newton, Kans.

Another section of the Cities Service project was completed during the summer for a distance of approximately 50 miles between Ottawa and Kansas City, Kans.

In announcing the completion of what ultimately will be a $36,000,000 project, Irelan also told of the completion of the new 17,600-hp. compressor station near Ulysses.

The new facilities will make available an additional 100,000,000 cu. ft. daily to the west side of the existing Cities Service Gas system.

By late 1949, or early 1950, Cities Service expects to finish the remaining 150-mile section between Hutchinson and Ottawa. Eventually, the whole 26-in. project, to cost $36,000,000, will have a capacity of approximately 370,000,000 cu. ft. daily. Present maximum of the system, without benefit of the new line, is around 630,000,000 cu. ft.

Approximately 55,000 tons of sheet-steel was transported from a Texas plant by water and rail to Milwaukee for pipe fabrication. The western contractor progressed at a rate of about 1½ miles each day on the Ulysses-Hutchinson section. *(Pipe laying methods and progress in laying 26-in. pipe this year in Kansas for the Cities Service project have been presented in The Oil and Gas Journal, page 184, September 23, 1948, and page 128, December 2, 1948, issues.)*

Materials Listed

The Ulysses-Hutchinson line required 40,650 tons of steel, 3,050 tons of enamel and 87,000 squares of felt. The Ottawa-Kansas City section took 11,000 tons of steel and 823 tons of paint.

The Ulysses plant takes gas from 400 wells in 375,000 acres.

The Ulysses station was designed for intake pressure of 260 psig. and a discharge pressure of 900 psig. with initial capacity of 235,000 M.c.f. per day. Investment in the Ulysses station, dehydration plant, company camp, and all facilities is approximately $5,000,000.

Main compressor units there consist of 11 Type 26 Cooper-Bessemer units of 1,600 hp. each, totaling 17,600 hp. Engines are equipped with dry type rectifier ignition, operating from auxiliary generating units. A centrifugal oil purifier serves the lubricating system.

Loose, sandy, subsurface soil at the plant site required soil stabilization work below engine foundations. Soil was excavated below the main building to a depth of 20 ft. (approximately 10 ft. below the foundation mat). The soil was then gradually replaced in 3-in. thick layers and compacted to a void ratio of less than 0.4 per cent. This procedure was necessary to prevent settlement of foundations and to eliminate excessive vibration.

(Measures by which this was accomplished were discussed by Russell W. Hofsess, engineer, Cities Service Gas Co., in an article published in The Oil and Gas Journal, page 226, September 23, 1948.)

The main building, approximately 72 ft. wide by 375 ft., is of steel frame, corrugated transite construction. The building has a full basement in which are located the service lines.

Both the water and gas coolers for the plant are of the radiator type utilizing air for cooling. Makeup water for the equipment is treated in a demineralizing water treating plant before being added to the water system. The auxiliary engines consist of four Type JS-8, Cooper-Bessemer 600 hp. gas engines directly connected to 400 kw., 480-volt, General Electric generators. The main electrical switchboard is of enclosed cabinet type with drawout air circuit breakers.

All yard piping was designed for 1,000 psi. operating pressure; the A.S.A. code for pressure piping was followed in the design. To eliminate any pulsating gas flow from the compressors, pulsation eliminating equipment was installed on suction and discharge lines of each compressor.

The solid absorption type dehydration plant utilizes activated bauxite for the adsorbent. Four split flow contacting towers 7 ft. in diameter and 47 ft. high were installed. The regenerative gas heater is of the Petro-Chem type and the regenerative gas cooler is a radiator type unit.

A total of 51 modern, full basement houses were constructed; also, a recreation building for the plant personnel. The plant site of 320 acres contains a modern airplane landing strip to accommodate company planes.

Plant Efficiency Improvement Is Theme of Amarillo N.G.A.A. Meet

by R. B. Tuttle

AMARILLO. — Operating personnel of the natural-gas-processing industry attending the Panhandle Plains Regional meeting of the Natural Gasoline Association of America here December 10, were given many pointers on how plant efficiencies may be improved. Both personnel and equipment phases of plant operations were discussed, on a nontechnical basis, by several of the industry's top-bracket engineers. All but one of the six papers dealt with experiences in plant operations. However, this one paper, "Practical Fractionation" by Frank Fowler, engineering department, University of Oklahoma, was focused on operation.

Fractionation Discussed

In his discussion on fractionators Fowler pointed out the major operating factors influencing efficiency. Avoiding any reference to design theory he took up each of the most important operating variables and explained their effect on tower performance. The discussion also revealed some interesting points on bubble-cap design. Fowler showed the effects of total and partial-condensing exchanger equipment on fractionating systems. Likewise he discussed internal and external reflux.

The two common types of reboilers came in for a substantial part of Fowler's discussion. He brought out how efficiencies of this equipment may be improved by maintaining proper temperature of tube walls. Where saturated steam is employed for the heating medium, maximum rate of steam condensate assures peak performance, it was stressed in the discussion. The disadvantages of superheated steam in reboiler operation was also recalled by Fowler.

Solid absorbents for a dehydration system which has a natural-gas capacity of 230,000,000 cu. ft. per day were discussed in detail by E. G. Hammerschmidt, Texhoma Natural Gas Co., Fritch, Tex. The data covered three different commercial absorbents. Curves which ranged over a time period of from 2 to 2½ years were employed to illustrate certain phases of the discussion.

Safety engineers from five different companies collaborated in the preparation of the paper "Safety Practices in Gasoline Plants." This paper stressed the important steps which must be taken to insure top results from a safety program. Although the natural-gas-processing industry as a group occupies a relatively good position in accident severity and frequency as compared to the entire petroleum industry, vast improvement in this position can be made, indicated C. L. Ritter, Continental Oil Co., Ponca City, one of the co-authors.

A new device for providing variation in compressor clearance was described by W. R. Barrett, Phillips Petroleum Co., Bartlesville. Now available commercially, the device comprises essentially a piston which is provided with pockets. These pockets, located within the piston proper, may be put into use simply by removal of the compressor's cylinder head and opening them as required. The complete operation may be accomplished without removing the piston from the compressor. The pocket-type piston was shown by Barrett to be a good investment in a number of instances.

Outlining the fundamentals relating to heat-exchanger maintenance, the paper by J. S. Conners and L. J. Webber of Phillips Petroleum Co., Phillips, Tex., made available important information to operating personnel. Since heat-exchanger efficiency is dependent primarily on the condition of its tube surfaces, causes and how to remedy their effects are important to the plant operator. The discussion outlined the principal causes of fouling and the degree to which such fouling influences efficiency. How the various types of exchanger equipment may be restored to normal efficiency by different methods of cleaning was presented in the discussion by Webber.

A talk on "Meters, All Kinds" by C. C. Clover, Wescott and Greis, Inc., Tulsa, completed the morning session of the 1-day meeting. The afternoon session finished with two animated sound films on distillation.

Early in the afternoon session Ernest O. Thompson, chairman, Texas Railroad Commission, speaking on conservation said: "As oil becomes more expensive to locate and produce, the greater efficiencies are required all along the line—greater efficiency not only in locating and drilling methods, but also in the production, transportation, processing, and refining."

Referring to the commission's efforts to reduce gas flaring in Texas fields, Thompson said: "We are now engaged in court proceedings to stop the flaring of oil-well gas from 16 oil fields. Early in January the operation of 25 more oil fields will be called upon to show cause why these should not cease producing oil until they provide ways and means to legally utilize the gas that comes up with the oil."

More than 325 engineers from all phases of the natural-gas-processing industry registered for the meeting.

Three of the Natural Gasoline Association of America directors confer with program committee members at the association's Amarillo meeting. They are: Frank M. Perry, Cities Service Oil Co., Bartlesville, Okla., director; E. F. Glasgow, Phillips Petroleum Co., Phillips, Tex., committee chairman; I. Earl Nutter, Hagy, Harrington & Marsh, Amarillo, director; John F. Lynch, La Gloria Corp., Corpus Christi, director; and C. A. Cash, Shamrock Oil & Gas Corp., Amarillo, committee member

International

WORLD-WIDE OIL DEVELOPMENTS

Hewetson Predicts Shipment of Alberta Oil in Near Future

OIL from Leduc and other northern Alberta discoveries will soon be shipped as far west as the Pacific Coast and perhaps east to Manitoba and northwestern Quebec, says H. H. Hewetson, president of Imperial Oil, Ltd., in commenting on Alberta's growing importance in the petroleum economy of both the United States and Canada.

He described the increasing throughput of the company's Alberta refineries and told of other construction plans involving a 24,000,000 cu. ft. cycling plant at Leduc and a Leduc-Regina pipe line estimated to cost $35,000,000.

The Leduc discovery in February 1947 touched off a widespread exploration and development program through western Canada. Continued increasing production and pipe-line transportation facilities will, in effect, move the Alberta fields closer to the large middlewestern United States markets or to eastern Canada consuming areas. This, Hewetson pointed out, will take place "when ample reserves of crude oil have been established and when the economics of the situation and the availability of steel permit."

Alberta Crude to Replace Imports

The contemplated movement of Alberta crude west, would displace oil which is now imported into the region from California, and Alberta shipments east, into Manitoba and Ontario would cut into the flow of Mid-Continent and eastern United States crude and products into this section.

The Leduc-Regina pipe line will be in operation by the end of 1950, according to the company's tentative plans. A 16-in. line is now under consideration. The distance is about 450 miles.

With a single pump station, the line would carry about 40,000 bbl. daily, and with eight stations, its capacity would be boosted to about 100,000 bbl. daily. At present, Leduc oil moves by pipe line from the field to a rail shipping point a few miles south of Edmonton. This line has a capacity of 35,000 bbl. daily.

Hewetson revealed in his remarks that engineering work is under way for the construction of a $6,500,000 absorption plant and repressuring system for Leduc. Recovery will be about 500 bbl. daily of natural gasoline, and processed gas will be returned to the formation.

Refinery Capacity Stepped Up

Imperial is stepping up capacity of its three refineries in the region, the company president said. Elimination of bottlenecks at the Regina refinery has increased throughput from 10,000 to 15,000 bbl. daily, and the Calgary plant is now running at full capacity of 9,500 bbl. daily. The new Imperial refinery at Edmonton is expected to be processing 11,000 bbl. daily next summer as against about 6,500 bbl. daily at present.

Hewetson said in his opinion the oil development in the northern Alberta region called for the construction of other refineries and that he hoped interests other than Imperial would undertake much work. The rapid development of the production gives promise of adequate crude-oil supply, he pointed out.

Imperial Oil, Ltd., is affiliated with Standard Oil Co. (N. J.). Its discovery at Leduc followed a number of years of discouraging wildcatting in western Canada. Hewetson's remarks last week in Calgary were made as the company announced a reduction in both crude and products prices which he said was possible because the increasing production permitted discontinuing high-cost American crude imports reflected in previous prices.

Creole October Production In Venezuela Shows Drop

Production of Creole Petroleum Corp., major operator in Venezuela, during October averaged 649,627 bbl. daily, a drop of 4,232 bbl. daily from the average for September.

October's production was divided, 484,437 bbl. daily from the Lake Maracaibo area; 4,558 bbl. daily from Cumarebo; and 160,632 bbl. daily from Eastern Venezuela.

The company's monthly report summarizing operations showed that 57,226 bbl. daily was refined at Carapito and an average of 19,846 bbl. daily at La Salina.

In the drilling phase, Creole maintained an average of 32 rigs operating during the month. Four exploration wells were completed, one dry in the Cumarebo area at 4,929 ft. and one in the Tamanaco area at 8,449 ft. The other two were oil wells, one in B.C.F. for 630 bbl. daily initial production at 5,716 ft. depth, and one in the Jusepin area with 3,258 bbl. daily initial production at 2,546 ft. depth.

Fourteen development wells were completed. Field, number, average initial production, and average depth follow: B.C.F., 7, 982 bbl. daily, 4,751 ft.; Quiriquire, 8, 612 bbl. daily, 4,181 ft.; and Temblador, 1, 224 bbl. daily, 4,065 ft.

Kuwait Output Rises 20 Per Cent in October

The fast-developing production in Kuwait by Kuwait Oil Co., Ltd., showed a rise of nearly 20 per cent in October over output the previous month.

The company's monthly report gave production for October at 794,459 tons, or about 189,600 bbl. daily. This is 31,400 bbl. daily greater than the 158,200 bbl. daily produced in September.

Total production from January 1 through October 31 was 4,603,875 tons. This corresponds approximately to 11,700 bbl. daily.

Kuwait Oil Co., Ltd., is owned equally by Gulf Oil Corp and Anglo-Iranian Oil Co., Ltd. First production followed the resumption of drilling after the war. Nine rigs are now running in the area.

Former Jersey Standard Manager In Hungary Gets Death Sentence

A HUNGARIAN people's court December 9 imposed a death sentence on the former manager of the Hungarian affiliate of Standard Oil Co. (N. J.) following a 2 weeks' trial on what the U. S. State Department earlier said were trumped-up charges of sabotaging the country's oil production.

The company official given the death sentence is Dr. Simon Papp, former chief geologist and until January 1 general manager of the Jersey affiliate, Hungarian American Oil Co. (MAORT). Prison terms were given two other officials, and a fourth was acquitted.

In New York, Jersey Standard officials said they were shocked to learn of the sentences. They pointed out that the State Department earlier this month in a note to the Hungarian Government denounced as fraudulent, false, and malicious the case worked up by Hungarian officials against the company and its executives.

Confiscation Possible

The harsh sentences given the Hungarian officials of the American-owned company were interpreted as part of an over-all Hungarian plan to justify confiscation of the properties. Assets of the company were seized September 25 but no official move has as yet been made toward nationalization.

The people's court which passed the sentences is considered the highest tribunal in the Communist-dominated country, but a possibility that Dr. Papp's death sentence might be commuted to imprisonment on appeal was indicated in the fact that the court cited his "merits in oil research for Hungary" and his "full confession."

Bogod Abel, head of the MAORT purchasing department, and Bela Binder, chief engineer, were given sentences of 15 and 4 years' imprisonment respectively. Dr. Kalman Barnabas, the company's chief geologist, was freed. It was reported that Dr. Barnabas recently joined the Hungarian Communist Party.

Dr. Papp, who is 70 years of age, has been associated with the Jersey Standard affiliate for several years. He had visited in the United States on various occasions.

The sentences given the three officials appeared to be another step in a steady campaign of Hungarian officials to gain complete control of the properties. The U. S. State Department in its protest called Hungary's course "an encroachment upon American rights and interests in Hungary for which the Hungarian Government must bear full legal and financial responsibility" (The Oil and Gas Journal, December 9, page 50).

Late in September, two American officials of the company, Paul Ruedemann, Hartsdale, N. Y., president, and George A. Bannantine, St. Louis, a director, were arrested and later freed through the efforts of the State Department. They returned to the United States and completely repudiated confessions which they said they signed under duress.

The Hungarian charges against the officials sentenced last week were that they had obeyed instructions of Jersey Standard to hinder production and had prevented efficient operation and the introduction of new equipment. In his alleged confession, Dr. Papp was asserted to have said he was told not to attempt to open new fields until there was a change in the political situation.

Such charges, the State Department said in its note, were made to feign grounds for bringing the companies under Communist control and for propaganda purposes.

Value of the properties owned by MAORT have not been definitely figured. Plant, equipment, and money owed by the government have been estimated at about $20,000,000. This does not include crude-oil reserves.

Gallegos' Charge of Meddling Is Denied

WASHINGTON.—The State Department formally denied last week that United States oil companies had supported the overthrow of Venezuelan President Romulo Gallegos, but at the same time emphasized past warnings to American interests operating abroad not to interfere in the political affairs of foreign countries.

In Havana, Cuba, Gallegos charged that the oil companies and reactionary elements in his country were behind the military coup which ousted him, but the department pointed out that at least two American companies are reported by the press to have already issued statements denying any intervention in Venezuelan internal affairs.

"The Department of State knows of no evidence or indications of any kind which would give the slightest support to such charges," it was declared. "As far as is known to the department, American companies and other entities represented in Venezuela avoided participation of any kind in the Venezuelan revolution of last month."

The department pointed out that Americans residing abroad "have repeatedly been warned that interference in the domestic political affairs of foreign states may result in the withdrawal of United States government protection, and the department takes this opportunity of reiterating and emphasizing this injunction."

While the department felt the Venezuelan situation warranted a formal announcement, Undersecretary of State Robert A. Lovett contented himself with a verbal refutation of a report from Buenos Aires that the United States will shut off government loans to Latin American countries for the development of their oil resources.

There is no foundation for the report, Lovett said, because the United States has never made such loans.

The Buenos Aires report said the decision to make no further loans was reached at a meeting in Rio de Janeiro. Department officials explained that there was a meeting of department economic officers in Rio about a month ago but that oil was not on the agenda, although they said there was probably some discussion of the subject, which is bound to pop up in any talk on Latin American affairs.

Peru Enacting Favorable Laws for Exploitation

New oil laws permitting large-scale exploitation of Peruvian oil deposits are being adopted by the military junta. A 10-man commission of technicians and lawyers, created by decree of the ministry of development, will draft the new legislation and present it to the junta for final enactment.

Existing legislation "does not stimulate competition between enterprises capable of exploitation in the scale required by this natural resource of the country," the decree stated.

The state will encourage the "effective exploitation of the oil riches of our subsoil," the decree declared, feeling that adoption of an oil policy consonant with modern world requirements was "a vital necessity" for Peru.

Tankers of Large Capacity Feature New Construction

by Dahl M. Duff

AN increase of about 25 per cent in the tonnage size of the world's tanker fleet is in prospect as a result of the tremendous construction programs now under way in both United States and foreign shipyards.

A total of 351 vessels, an aggregate of some 5,800,000 deadweight tons was involved in tanker construction throughout the world as of August 15 of this year. The number of vessels under construction or on order is about one-sixth of the present world total.

The trend, particularly in the United States, is toward the so-called supertankers of 25,000 tons and over. Early in the month, one of the first of these large-size vessels to be completed in the United States was launched. It was the "Esso Zurich" built for Standard Oil Co. (N. J.) by Sun Shipbuilding & Dry Dock Co. at Chester, Pa.

The current bulletin of the American Bureau of Shipping lists, under construction, or on order in United States yards, 57 tankers of about 1,457,800 tons as of September 1. In the United Kingdom 154 tankers of 2,210,100 tons were under construction or on order, and 88 units of 1,431,400 tons are reported for Swedish yards.

Fifty-two of the 57 tankers under construction in the United States as of September 1 were for United States companies. The larger size of these vessels is shown by the fact that they are equivalent to 86 of the T-2 type tankers built during the war.

Norway Leading

Of the nations involved in the present tanker construction, the greatest fleet, building or on order, is for Norway. That country has booked 122 tankers of 2,056,000 tons, all but four in yards outside Norway. These tankers for Norway are equivalent to 118 T-2's. Upon delivery, Norway's tanker fleet will be increased about a third in number of vessels.

The American Bureau of Shipping gives further detailed data on work and orders for American shipbuilding companies. This information is as of November 1, 1948, and shows at that time 64 tankers were under construction or on order in American yards. Also listed are 54 oil barges booked for various domestic oil and transportation companies.

The 64 tankers listed as of November 1 totaled 1,011,884 gross tons. Of interest also is the fact that 63 of the 64 tankers called for turbine propelling power using a total of 840,850 hp.

Of these 64 seagoing tank ships, 55 were of 26,000 deadweight tons or more. Largest of those listed were three oil tankers of 32,000 deadweight tons each. These vessels are to be built by New York Shipbuilding Corp., Camden, N. J., for Philadelphia Tankers, Inc., Philadelphia, Pa. Gross tonnage is 19,540; dimensions are 625 by 85 by 45 ft. Power will be turbines of 18,000 hp.

Next largest in the list are four 30,000-deadweight ton tankers being built by Welding Shipyards, Inc., Norfolk, Va., for Oceanic Tankships, S.A., New York. One of these vessels, "Bulkpetrol," was launched last September 25. These two tankers measure 615 by 84 by 43 ft., 9 in., and use a 17,500-hp. turbine power.

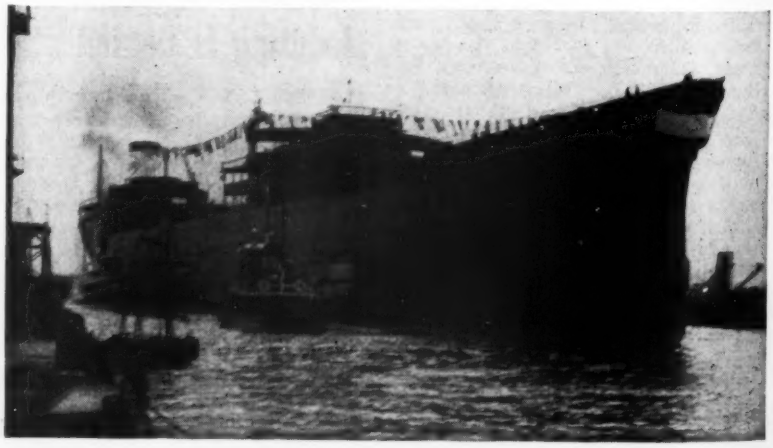
Data on the "Esso Zurich," first of the 14 supertankers in the Standard Oil Co. (N. J.) program to be launched, shows some of the major characteristics of these giant petroleum transport vessels. Mrs. Frank Abrams, wife of the board chairman of Jersey Standard, launched the vessel in ceremonies December 4.

The "Esso Zurich," a single-screw turbine-driven tanker, is the forerunner of a number of similar vessels now under construction. It was designed jointly by Sun Shipbuilding & Dry Dock and Jersey Standard's marine department and is the largest tanker ever constructed on the Delaware River.

Principal features are summarized as follows: Length, over-all, 628 ft. 0 in.; length, B.P., 600 ft. 0 in.; breadth, molded, 82 ft. 6 in.; depth, molded,

TANKERS UNDER CONSTRUCTION

Builder and owner—	No. of vessels	Deadweight tons each
Bethlehem-Sparrows Pt. Shipyards, Sparrows Pt., Md.:		
Gulf interests, New York	4	28,000
Foreign interests	1	28,000
Olympic Oil Lines, Panama	4	28,000
Foreign Tankship Corp., San Francisco	5	28,000
Bethlehem Steel Co., Shipbuilding Division, Quincy, Mass.:		
The Texas Co., New York	4	28,000
Foreign interests	1	28,000
Atlas Tankers, Inc., New York	5	28,000
Newport News Shipbuilding & Drydock Co., Newport News, Va.:		
Standard Oil Co. (N. J.)	10	26,000
N. G. Livanos, New York	1	26,000
Sun Shipbuilding & Dry Dock Co., Chester, Pa.:		
Standard Oil Co. (N. J.)	4	26,000
Gulf Oil Corp., New York	2	26,000
Tankers Navigation Co., New York	7	26,000



The "Esso Zurich," first of the 12,500-hp. super tankers built for Standard Oil Co. (N. J.) takes to the water at the Sun Shipbuilding Co. yards in Chester, Pa. December 4. Photograph courtesy, General Electric Co.

42 ft. 6 in.; draft, designed, 31 ft. 6 in.; deadweight, 26,000 tons on 31 ft. 6 in. draft; speed, 16 knots; S.H.P., 12,500 normal; liquid cargo capacity, 230,997 bbl.; dry cargo capacity, 53,160 cu. ft.; and fuel oil capacity, 18,467 bbl.

Cargo pumps have a capacity of 23,400 bbl. per hour which will discharge the vessel's cargo in less than 10 hours, the cargo lines being 14 in. and the stripping lines 6 in. All the most modern appliances have been adopted for safety of life at sea including radar, radio direction finder, gyro pilot, and compass.

Other tankers of 26,000 deadweight tons or more under construction or on order in the United States, according to the American Bureau of Shipping report, as of November 1, are shown in the accompanying table.

Cost of the supertankers under construction or on order in the United States is estimated at between $5,000,000 and $6,000,000 each. Thus, the total program involves an expenditure of some $300,000,000.

Officials in the national defense establishment in Washington have been interested in promoting the construction of special tankers of 25,000 deadweight tons and a cruising speed of about 20 knots. Government experts are now studying proposed designs. Oil companies feel that the Government should bear the additional cost of about $2,000,000 for the special defense features, and Washington is expected to make a decision on construction of these tankers in the near future.

International
WORLD-WIDE OIL DEVELOPMENTS

Reopening of Kirkuk-Haifa Pipe Line Sought By Britain, France, and U. S.

THE British, French, and United States governments have asked the Iraq Government to reopen the Kirkuk-Haifa crude-oil pipe line which has been closed since last May as a result of the Jewish-Arab fighting.

Informal diplomatic representations have been made in Baghdad, but as yet no reply has been received from Iraqi officials, according to reports emanating last week from the British foreign office in London.

Success of these moves would not necessarily mean the reopening of the 63,000-bbl. daily capacity Haifa refinery. Crude oil sent through the line would be shipped out of Israel to avoid any possible assistance to the Israeli economy or war effort.

Closed Line Causes Oil Loss

An estimated 9,000,000 bbl. of crude oil has been lost as a result of the closing of the pipe line which simultaneously forced a cutback to about half of the normal 90,000-bbl. daily production of Iraq Petroleum Co., Ltd. Iraq's 1948 total crude production is expected to show a drop of about a third from the 1947 output which was at a rate of 99,200 bbl. daily.

The importance of this production to the economy of Western Europe and the Marshall plan apparently led the three governments to seek reopening of the line. Whether it will be possible to use the line prior to a general settlement of the entire Palestine issue is problematical. The Iraq Government is understood to want assurances the oil produced in the country will not fall into Israeli hands or be used to their benefit.

While taking no sides in the political dispute, officials of the oil companies involved emphasize the tragic effects of shutdown of normal movement of Iraq crude. The Haifa plant of Consolidated Refineries, Ltd. (Anglo-Iranian Oil Co., Ltd., and Shell interests), is a major industry in Palestine, and the Iraq Government leans heavily on its oil royalties as a source of income. At the present time, negotiations are under way between officials of the Iraq company and the Iraq Government over government demands for higher royalty rate and other revisions in the concession contract.

Last year, in an effort to provide increased transportation facilities which would allow production to be stepped up, the Iraq company commenced the construction of 16-in. lines from Kirkuk paralleling the existing 12-in. lines, one the Haifa branch and the second extending to Tripoli in Lebanon. The Haifa 16-in. remains unfinished as a result of the political situation, and the other 16-in. to Tripoli is not due for completion until early 1950.

The Iraq Government has allowed crude to move through the existing 12-in. to Tripoli, and most of this has been going to European destinations except for about 3,000 bbl. daily refined in Tripoli for local consumption. The French, with a 23.75 interest in the Iraq company and no other major Middle East holdings, are particularly dependent on Iraq oil.

Yugoslavia to Get Oil Under Trade Agreement

ONE hundred thousand tons of Middle East crude oil (about 750,000 bbl.) is scheduled to be received by Yugoslavia under terms of the proposed Anglo-Yugoslav trade agreement now being discussed.

It is understood the oil will be supplied by Anglo-Iranian Oil Co., Ltd., from its properties in Iran and its half interest in Kuwait Oil Co., Ltd. The amount involved averages about 2,000 bbl. daily over the year's term of the proposed agreement, and presumably would be refined in the five small refineries reported in existence in Yugoslavia.

The agreement is not to become effective until satisfactory compensation terms are agreed upon. Besides oil, Britain is to supply textile materials and machinery, and receive timber, furniture, and food items.

The trade agreement is of some significance in that it is with one of the so-called Iron Curtain countries of Eastern Europe. It appears to be indicative of the inability of Eastern European production, principally Romania, to meet needs of the area.

Yugoslavia itself is making efforts to expand its own small indigenous crude-oil production. This output was discovered during the German occupation, reached a peak of about 2,000 bbl. daily in 1944, and as of early last summer was reported to be about 1,100 bbl. daily.

The Yugoslav oil and gas industry was nationalized early in 1947 and the present regime has ambitious plans for development. The goal for 1951 is 500,000 tons (about 11,000 bbl. daily), and the publication of the Yugoslav Communist party recently asserted: "Well organized exploitation in terrains already known, as well as the first drilling in new terrains clearly indicates that we can fulfill these plans, despite considerable difficulties."

Anglo-Iranian Production Increases in October

Production of crude oil in Iran by Anglo-Iranian Oil Co., Ltd., during October amounted to 2,268,000 long tons, or approximately 561,000 bbl. daily.

The October production represents an increase of approximately 8,000 bbl. daily over the September output.

The Anglo-Iranian company's monthly report for October also showed the year's cumulative production through October at 20,445,000 long tons. This corresponds to about 514,000 bbl. daily. In 1947, Iranian production averaged 422,000 bbl. daily for a year's total of 154,086,600 bbl.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Too Much Regimentation

WASHINGTON. — A long-standing difference of opinion within the ranks of the National Security Resources Board over the extent of its responsibilities under the National Security Act of 1947 reportedly is at the root of Chairman Arthur M. Hill's resignation, which was accepted by President Truman last week.

The conflict in the board has revolved around purported plans to regiment industry in anticipation of war rather than the steps to be taken in the event of war.

In Washington, the President's action was seen as going a long way toward allaying fears in industry and Congress that the board was planning peacetime counterparts of the wartime control agencies. Members of Congress some time ago indicated they would explore the board's activities when its appropriation requests come up for consideration this winter.

There have been indications for some time that Hill was supporting the idea that industry should be put into a state of constant preparedness for war, although the provisions of the National Security Act which set the board up call merely for continuous study of the nation's natural and industrial resources and advice to the President concerning the coordination of military, industrial, and civilian mobilization in the event of an emergency.

Under the plans attributed to Hill the NSRB would become the core of a peacetime control structure, with authority to tell the various government agencies what must be done to gear the country for a war emergency. So far as the oil industry was concerned, there was ground for speculation in the suggestion made by Wallace Pratt, former petroleum adviser to Hill, that an underground reserve of 1,000,000 bbl. daily could be built up by cutting domestic production back by 20 per cent.

The story in Washington is that the members of the board, who haven't held a meeting since September 9, could not agree on the program, the upshot being that the chairman now will return to his executive post with Greyhound Bus Co.

Profit Fooling

THE Congressional joint economic committee has started a study of corporate profits and the first thing it learned was that American industry is fooling itself about them.

Corporations have been making a lot of dollars, but the dollars aren't what they used to be, the committee was told in more elegant language by two university professors.

It's all due to the fact that present accounting methods are obsolete and don't reflect the changing value of the dollar or new conditions and new problems, the professors explained.

Business is deducting its costs, particularly depreciation, in terms of a dollar worth two or three times what it is now, with the result that in the past 3 years it has overstated its profits by more than $16,000,000,000.

The committee didn't have to go to college to learn that—it could have called a couple of oil producers to tell it that maybe 80 per cent of today's production is from properties developed 7 years or longer ago with dollars that bought a lot more than they do today. Oil produced from fields now being developed won't return anything like as much "profit."

ERP Oil Eyed

THE Marshall-plan countries won't need as much next year in the way of financial aid from the United States as they did this year, and that highly desirable situation may raise new problems for the Economic Cooperation Administration.

ECA plans now call for an appropriation of about $4,000,000,000 for the coming fiscal year, or anywhere up to $1,000,000,000 less than was appropriated for the current year. This reduction, however, is not the result of any effort to reduce the aid which is being given western Europe, but reflects the improving financial condition of the participating countries.

This increased availability in western Europe of funds with which to buy abroad may create some difficulties unless an agreement can be reached for the orderly programing of all procurement, ECA - financed and independent.

With money over which ECA has no control, it would be possible for some of the ERP countries to enter the market and buy more oil than ECA thinks they should have, in view of world supplies, either to proceed more rapidly with the introduction of an oil economy or for the purpose of building up refined production with a view to export business. Such a development might upset the supply situation and raise new problems.

For this reason, it is expected that ECA will seek to maintain control over all procurement of oil and other commodities which may be in a similar delicate supply and demand balance. The supply situation in oil is much easier than it was a year ago, it is true, but it is not considered so improved that planned distribution becomes unnecessary.

Close Ranks

GOVERNMENT officials who fail to go along 100 per cent on administration policy may find they have no place in the close-knit organization which President Truman is seeking to build up.

The President, apparently recalling the many times in which federal agencies worked at cross purposes during the Roosevelt administration and not unmindful of the fact that there have been times since he took office when his own officials failed to support his policies, has let it be known that he intends to be boss from now on.

Last winter, when Truman sought control legislation from Congress, many of the top officials on whom he had to depend for support made only weak arguments before congressional committees, sometimes giving the impression that they were going through the motions of advocating measures in which they themselves had no confidence.

It also has been impossible to get complete agreement between the three armed services on coordination of the military establishment, and there has been a pronounced lack of mutual effort between other agencies.

Last week the President posted a warning. Announcing the appointment of John R. Steelman as acting head of the National Security Resources Board, he said he wanted close coordination among all federal agencies and that in bringing this about Steelman would have the full support of the White House, the cabinet and the agency heads.

There will be some changes in the cabinet after January, and there are likely to be some changes in top agency jobs where obstructions have been noted in the past.

Slicing ECA's Pie

CONGRESSMAN WALTER C. PLOESER of Missouri, chairman, soon to be ex, of the House small business committee, is riding the Economic Cooperation Administration because, he says, most of the money

granted the Marshall-plan countries is being spent with a few big businesses in each commodity and little business is being virtually excluded.

Ploeser based his argument on cotton, where 1 large company and its subsidiaries got 71 per cent of the business, 3 other companies divided 11 per cent, and 62 other suppliers received only 18 per cent all told.

"There seems to be no excuse for one firm to be obtaining such a dominant percentage of the total business," he said. "If any situation comparable to this should arrive in our domestic economy the Department of Justice undoubtedly would conduct an investigation for violation of the antitrust laws."

Ploeser wouldn't have been able to make quite as good a showing if he had submitted the same argument on oil. A recent compilation of suppliers shows that during the first half of September some $16,000,000 worth of oil and products was placed on order with 30 concerns. The largest amount of business going to any one firm was $4,413,000, and the four largest suppliers got about $9,000,000 between them, and they were companies which one would expect to find in the export business in a big way.

One point doesn't seem to have been emphasized by Ploeser or other critics. There may be—probably are—some small companies that would like to get ECA business and can't for one reason or another, but there are a lot of companies that could get business and don't want it for reasons of their own.

Who's Lobbying?

THE administration's view that those who work for achievement of its objectives are all right but those who oppose its legislation are lobbyists will be the keynote of an intensive drive against lobbyists next year.

Lobbying is perfectly legal and was so recognized by Congress in enacting the lobbyists' registration act. What the administration doesn't like is that all the lobbies seem to be working against it, and none of importance has come out in favor of any Truman legislation. Equally important, "big business" generally actively supported President Truman's opponent in the recent campaign.

When the lightning strikes, the oil industry may be among the first to be hit. Administration supporters in Congress even last session were talking of a "tidelands lobby" which was vigorously opposing government ownership of the California submerged oil lands; a "gas lobby" working for revision of the Natural Gas Act; and "oil lobbies" seeking steel that was needed here for foreign operations, opposing the President's efforts to secure price-fixing, rationing, and allocation powers, and so on. In the lexicon of many members, "oil" is synonymous with "big money" and so a fair target at any time.

Oil, however, isn't to be the only victim of the inquisition. Real estate interests, the medical profession and such groups as the Committee for Constitutional Government and, above all, the National Association of Manufacturers are all noted in the list.

When the smoke clears away, the administration hopes that the effectiveness of lobbies will have been killed for at least 4 years. It will still be all right to lobby, which is perfectly legal, but it won't be healthy to lobby against legislation bearing the stamp of administration approval.

M. E. True Will Speak at Kansas A.I.M.E. Meeting

A paper entitled, "Semiautomatic Power-Operated Drilling Machinery," by Martin E. True, Humble Oil & Refining Co., will be the feature of the first annual meeting of the newly authorized Kansas section of the American Institute of Mining and Metallurgical Engineers, Wichita, Kans., December 17.

The group also will adopt its bylaws and complete a slate of officers at the meeting. V. J. Mercier has been named chairman but other officers have not yet been elected.

Joint Economic Committee Is Told Oil Industry "Strapped" for Cash

WASHINGTON.—Oil corporation profits this year will be two-thirds again as large as in 1947 but the industry, nevertheless, is "strapped for cash," the congressional joint economic committee was told December 9 by Joseph E. Pogue, vice president of the Chase National Bank in charge of its petroleum department.

Testifying in the committee's investigation of the factors underlying the present price and profit structure, Pogue told the committee that profits of 1948 can be compared with those of previous years only by translating them into dollars with the same buying power.

Profits, he said, are overstated in periods of inflation, and while his study of the reported net income of 30 oil companies shows it will amount to $1,410,000,000 for the first 9 months of 1948, an increase of 67 per cent over the same period last year, the $563,000,000 over the 1947 period will not cover the increase of $600,000,000 to $700,000,000 in capital expenditures and additions to working capital over last year.

This increase in capital expenditures, he said, will be reflected in dividends which, for 1948, will be only 24 per cent of reported net income compared with 35 per cent in 1947 and 43 per cent in 1946.

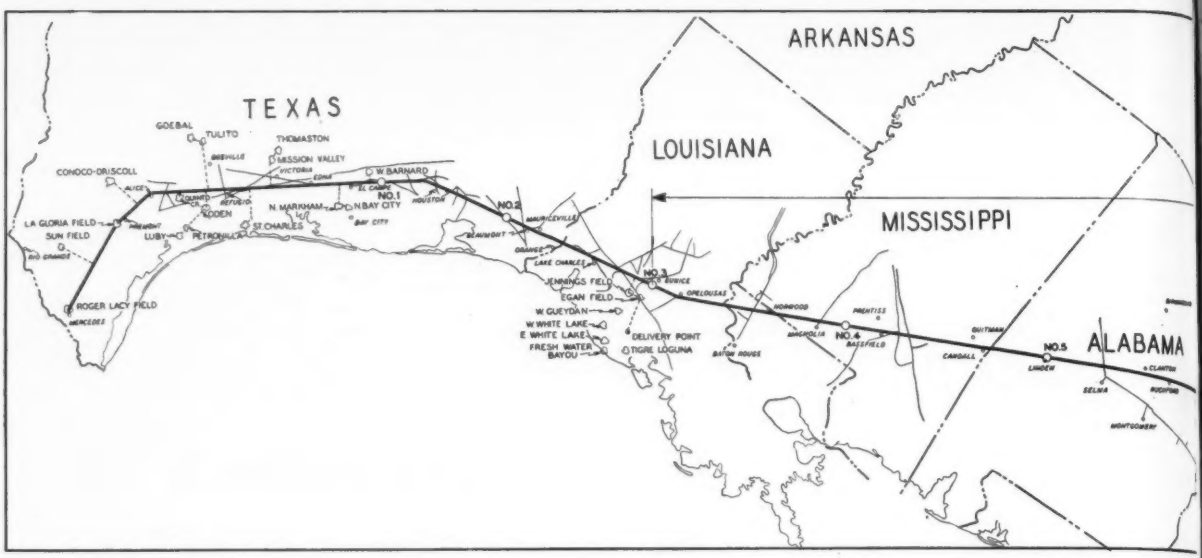
"This drop in the rate of disbursements is pretty conclusive proof that the industry was 'strapped' for cash in 1948 despite the magnitude of its income, and that earnings were further converted into fixed assets," he pointed out.

"It is fortunate that this was so," Pogue added. "A year ago we faced the prospects of a tight, if not short, oil supply. Today our tanks of oil are full and supply is beginning to run ahead of demand. If this trend continues, the need for capital formation will become less insistent and the mechanism of the market will reduce profit margins and bring about a lower level of 'profits.' In this cycle, we have an almost perfect example of the function of profits in converting an economy of oil scarcity into one approaching abundance."

Explaining the unreliability of profit comparisons made in terms of dollars, Pogue said that while the profits of 30 companies rose from $763,000,000 to $1,219,000,000 between 1946 and 1947, the figures, translated into terms of prewar dollars, would be only $509,000,000 and $648,000,000. This is particularly important because corporations must continue to make capital expenditures, the $2,076,000,000 so expended in 1947 accomplishing no more than could have been done for 840,000,000 prewar dollars.

"Several circumstances combine to make the capital needs of the petroleum industry exceptionally heavy, aside from the obvious one of inflated costs," Pogue said. "In the first place, the industry is highly technological, which means that the capital investment per unit of output is large—several thousand dollars per daily barrel. In the second place, the petroleum industry is in a stage of vigorous growth requiring large investments for new facilities. Thus the industry must form capital not only for replacement but also for expansion."

For the economy as a whole, it has been estimated that about two-thirds of capital formation is for replacement and one-third for expansion, but for the oil industry it is probable that the two categories recently have been more nearly equal. But, he said, the need for capital funds for oil expansion may be expected to decline in the future, since the rate of growth in demand will probably decelerate, but by the same token the demands for replacement will increase as the industry becomes larger.



Route of 1,839-mile main line of Trans-Continental Gas Pipe Lin

Enormous Trans-Continental Pipe Line Construction Will Start in May 1949

by Paul Reed

RECENT completion of financial arrangements for expenditures of approximately $200,000,000 by Trans-Continental Gas Pipe Line Corp. will clear the way for letting its first pipe laying contracts early in 1949. The company's projected 2,250-mile line from the lower Rio Grande River Valley to New York City will be the longest pipe line ever built as a single undertaking.

Though the first deliveries of pipe are expected to arrive from California in January, actual pipe laying is not due to start until May 1949. Approximately six contractors' spreads will be in the field during 1949.

To Require 15 Spreads

By the time gas arrives at the eastern terminus in November 1950, there will have been approximately 15 spread sections along the entire route. Final completions of the initial project is expected by January 1, 1951. Federal Power Commission authorization was granted May 29, 1948, for this huge project which promises to overshadow all other pipe-line building in the United States in the 1949-50 period.

The main line will consist of 1,210 miles of 30-in., 558 miles of 26-in. and 71 miles of 20-in., totaling 1,839 miles. The additional 411 miles of the project for lateral lines will be built of pipe in several diameters from 6-in. to 16-in.

Longest 30-in Line in U. S.

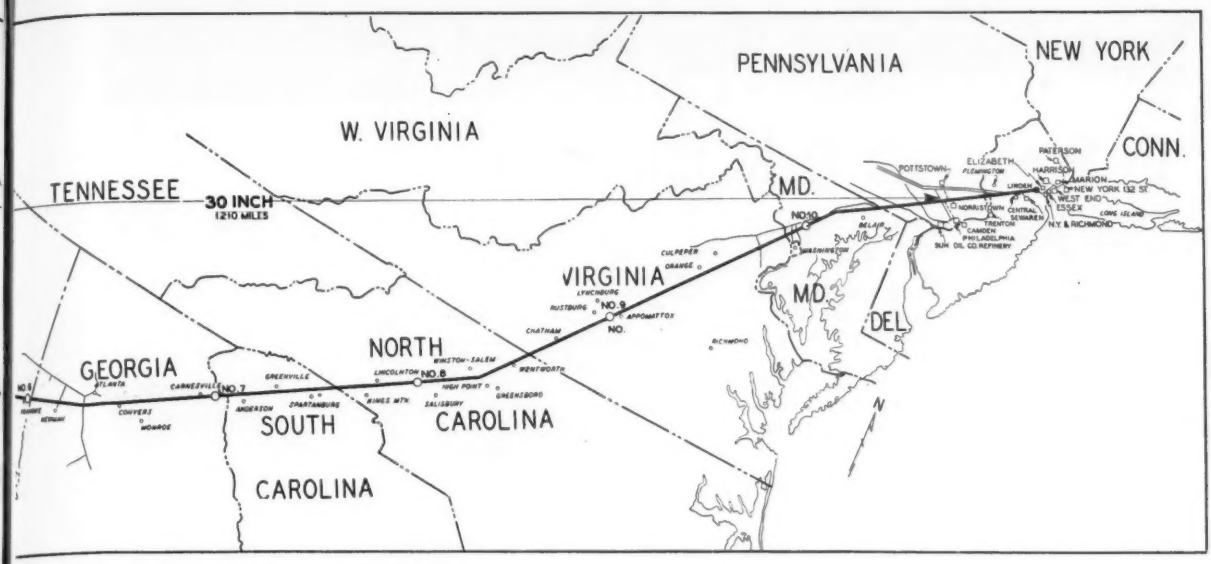
In early planning for the line it has been mentioned that 1,210 miles of 30-in. would probably be laid from Eunice, La., to Chester Junction, Pa. This will be the first 30-in. project laid in the United States longer than 214 miles.

Point of origin is approximately 15 miles north of the Rio Grande River in Hidalgo County, near McAllen, Tex. The route will follow the coastal plain along the Gulf of Mexico and the Atlantic Ocean to a terminus on the east bank of the Hudson River where it will connect with the system of Consolidated Edison Co. at 132nd Street, New York City.

The route will pass north of Houston and Beaumont, Tex., and Lake Charles, La. The Mississippi River will be crossed 50 miles north of Baton Rouge. From there the line will go northeasterly near Montgomery, Ala., Atlanta and Athens, Ga. Here it will turn northerly to pass near Spartanburg, S. C.; Winston-Salem, N. C.; Lynchburg, Va.; west of Washington, D. C., north of Baltimore, Md., Philadelphia and into Linden, N. J. Thence it will go north through Elizabeth and Newark, N. J., to the New York City terminus.

A manager constructor's contract for the entire project has been made with Fish Engineering Corp., Houston, for complete design, engineering and construction of all phases of the project. This is the largest single contract of its kind in the history of the natural-gas industry. The Fish organization has been identified with the Trans-Continental project as consulting engineers from the beginning. Work under this contract is already under way. Control points along the route have been established and aerial surveys are being made. Ground surveys on particularly difficult sections are in progress.

Kaiser Co., Inc., has contracted to furnish 500,000 tons of steel plate over a period of approximately 24 months from its Fontana, Calif., mill at a minimum rate of 15,000 tons and a maximum of 25,000 tons per month. Consolidated Western Steel Corp. has contracted for the fabrication of 30-in. and 26-in. main-line pipe at their Maywood plant near Los Angeles. The 20-in. main-line pipe and the 6-in. and 16-in. lateral-line pipe, river-crossing pipe, and miscellaneous small pipe will be fab-



Pipe Line Corp. to be constructed in the 1949-50 period

ricated by A. O. Smith Corp. at Milwaukee.

The line is designed for initial capacity of 340,000,000 cu. ft. daily which can be ultimately increased to 500,000,000 cu. ft. daily. The 72,000 compressor horsepower will be divided into 10 compressor stations for the initial program. Later 220,000 compressor horsepower at 19 stations will be required for ultimate capacity.

Estimated natural-gas reserves of 90 trillion cubic feet are contained in the area to be traversed by the Trans-Continental line in Texas, Louisiana and Mississippi. Total reserves under contract approximate 4 trillion cubic feet, are regarded as adequate for the ultimate capacity of the line over a 20-year period.

Trans-Continental will take gas from the following fields: Conoc-Driscoll, La Gloria, West Gueydan, Starr County, Odom, Lube and Petronilla, Lacey, Quinto Creek, Bee and Live Oak counties, North Markum and North Bay City, Egan, West Bernard, Fresh Water Bayou, and surrounding areas in Texas and Louisiana.

Sales Contracts Already Made

Sale contracts have been made with Consolidated Edison Co. of New York, Brooklyn Union Gas Co., Public Service Co. of New Jersey, Philadelphia Electric Co., Long Island Lighting & Power Co., Brooklyn Burrough Gas Co., New York & Richmond Gas Co., and Elizabeth Town Gas Co. All sales have been apportioned on recommendation of the Federal Power Commission.

According to financial arrangements completed for the entire project, common stock has been placed by private subscription. No public offerings will be made. Long term first-mortgage bonds, which have been oversubscribed, provide for 75 per cent of the required funds. Approximately 50 per cent of the common stock of Trans-Continental is owned and controlled by Texas interests. The company was founded and initially financed solely by Texas people and Texas capital. *(Further details regarding financing were published in The Oil and Gas Journal, page 128, December 2, 1948.)*

Trans-Continental Gas Pipe Line Corp., a Delaware corporation, is a recent successor to Trans-Continental Gas Pipe Line Co., a Texas corporation, originally organized to bid for the Government-owned Inch lines. After being unsuccessful in purchasing these Inch lines, the company proceeded with plans for the present project, on which FPC hearings continued from October 1947 to May 1948.

Pennsylvania Grade Crude Is Reduced 50 Cents

JOSEPH SEEP PURCHASING AGENCY of South Penn Oil Co., the nation's largest producer of Pennsylvania Grade crude oil, has announced a reduction of 50 cents per barrel in the price of all grades of Pennsylvania Grade crude which it purchases, effective December 11. The reduction brings the new price to $4.50 per barrel.

George J. Hanks, president of South Penn Oil Co., said that the price was cut because of "an unhealthy market situation," and that since the last 50-cent increase initiated by Sinclair Oil Co. a year ago South Penn found itself stockpiling more than 2,000 bbl. per day as a result of overproduction.

Purchasers of Pennsylvania Grade crude following the price cut include: Pennzoil Co., Oil City, Pa.; Quaker State Oil Refining Corp., Oil City; Tide Water Associated Oil Co., Bradford; Valvoline Pipe Lines Co., Freedom, Pa.; Brundred Oil Corp., Oil City; Cities Service Co., Titusville, Pa.; United Refining Co., Warren, Pa.; Elk Refining Co., Charleston, W. Va.; Waverly Oil Works, Pittsburgh; and Wolf's Head Oil Refining Co., Oil City. Other buyers were expected to meet the 50-cent reduction immediately.

Valvoline Pipe Lines Co., in addition to the 50-cent reduction of Pennsylvania Grade crude, announced a 30-cent per barrel cut in the price of Zanesville crude oil, making the new price $3.65 per barrel. Valvoline made a previous reduction of Zanesville crude November 16 when it announced a reduction of 54 cents, lowering the price from $4.49 to $3.95.

New prices of the various grades of Pennsylvania Grade crude oil as posted by the Seep Agency and other purchasers follow: Allegany district oil in Bradford Transit Co., $4.50; Bradford district oil in Bradford Transit Co., $4.50; Bradford district oil in National Transit Co., $4.50; Bradford district oil (Tiona-Sheffield) in National Transit Co., $4.50; Pennsylvania Grade oil in South West Pa., P.L., $4.29; Pennsylvania Grade oil in Eureka Pipe Line Co., $4.29; Buckeye-Pennsylvania oil in Buckeye Pipe Line Co., $4.29; Middle district, $4.50; and Franklin heavy district, $5.25.

A South Penn spokesman said that it had been difficult for the company to market its refined products from the total current Pennsylvania Grade crude production of 61,000 bbl. per day, and that approximately 750,000 bbl. of crude was added to stocks during the past 12 months.

Texas Commission Wins Reversal Of Panhandle Field Injunction

HOUSTON. — Canadian River Gas Co. lost a round this week in its attempt to keep the Texas Railroad Commission from reducing the company's gas production in Panhandle field by 75,000 M.c.f. of gas daily.

A three-judge federal court in Houston killed a temporary injunction granted in Austin federal district court on September 30. The temporary injunction was to halt action on a September 24 Railroad Commission order which called for limiting Canadian's gas output by 30 per cent. Testimony by company attorneys indicates that the concern's gas production in Panhandle field is 250,000 M.c.f. daily or 13 per cent of the field's total daily allowable. Panhandle field with an allowable of 1,884,301 M.c.f. is by far the largest gas producer in Texas.

First Order in 1935

Background of the case goes back to September 10, 1935. On that date, the Railroad Commission issued proration orders for Panhandle field. A federal court on February 11, 1937, granted Canadian an injunction against this order. It is the company's contention that the September 24 Railroad Commission order of this year is, in effect, the same thing as the old 1935 order.

In its petitions, Canadian claimed that the recent order cuts their production below their present and predicted immediate future market demands. It declares that it will be forced to buy from other producers, already heavily committed, gas which the company itself could produce. Further, the gas company claims that it would have to share its two pipe lines and markets with third parties which have no right to such a "privilege."

In further argument, Canadian opined that the commission's order would cost it $9,000,000. Thus, it argues, the company is deprived of its property without due process of law, a violation of the Fourteenth amendment to the U. S. Constitution.

Elton M. Hyder, Jr., assistant state attorney general, argued for the state and the commission that the new order is an entirely different one from the old 1935 order. He further contended that action of the Fiftieth legislature grants conservation enforcement power to the commission, and that U. S. Supreme Court decisions have affirmed that power.

Hyder further asserted that the the Canadian River Gas Co. should take its case to the Travis County district court where he said all action against the Railroad Commission should originate.

In killing the temporary injunction, the court recommended that the company take the case to the Travis County court. They also ruled that they would not hear the company's plea for a permanent injunction and for contempt of court action against the Railroad Commission. The company had asked that the commission be found in contempt of court for violating the court order of February 11, 1937.

The judges also recommended that the company take its plea for contempt action to a one-judge federal district court. Attorneys for the company are reported to have said they will consider asking the U. S. Supreme Court to force the three-judge court to hear the case.

Representing the company at the Houston hearings were: Dan Moody, former governor Texas; Paul McDermott, Fort Worth; and Wales H. Madden and Jack Adkins, Amarillo. Besides Hyder, Joe R. Greenhill, assistant attorney general, and John Phillips, Railroad Commission attorney, defended the commission.

Judges in the case were Joseph C. Hutcheson, Jr., federal circuit district judge, and federal district judges, Ben H. Rice and T. M. Kennerly.

Atlas Corp. Acquires More Barnsdall Stock

COMPLETING another phase of its objective to acquire control of Barnsdall Oil Co., Atlas Corp. of New York City, through its president, Floyd B. Odlum, announced last week the purchase of approximately 200,000 additional shares of common stock. This was achieved through the unusual means of an open bid at a fixed price of $45.00 per share through the New York Stock Exchange facilities.

The latest purchase gives Atlas Corp. slightly in excess of 700,000 shares of Barnsdall Oil Co. out of 2,223,000 shares outstanding, or approximately 31 per cent. It represents a cash investment of approximately $28,000,000.00. It is understood that some of the old T. N. Barnsdall family stock is included in the acquisition.

Barnsdall Oil Co., one of the oldest trade names in the oil industry, was founded in 1867 at Titusville, Pa., by T. N. Barnsdall. Since that time it has been managed continuously by his later associates and members of the family. Atlas Corp. is now represented by 2 members on a board of directors composed of 11.

Atlas Corp. is well known in financial circles as a holding company which has specialized in acquiring working control of a great diversity of corporations, usually small or medium in size. Odlum last week said the corporation has made Barnsdall one of its major special situations. So far as is known this is Atlas Corp.'s first large venture into the oil business.

Next Week

Heat-Exchanger Maintenance.—Refinery and plant men will find a valuable set of papers on this subject, for future reference and use. The symposium (three papers) encompasses work of three engineers from The Texas Co.'s Port Arthur refinery, two process engineers with Standard Oil Development Co., and two experts in the chemical treating-cleaning field.

New Development in Compressors.—An important problem both from investment and operating natural-gasoline plants, gas pumping units, etc., is the matter of cylinder size vs. changing gas loads. Reported as a very promising solution, and inexpensive and easy to handle—are the new-type clearance pockets which are "built in" the pistons themselves. In one plant situation where new cylinders would have cost $100,000 to meet changing gas-compression requirements, the clearance pocket-type pistons were installed instead at a cost of only $11,000.

What Are Offshore Drilling Costs?—The Journal's Gulf Coast editor takes a typical operation apart dollar by dollar to examine, costwise, these widely publicized developments. Also accompanying the discussion is an item-by-item picturization by the Journal's staff photographer.

Where Look for Future Oil Fields?—This article is intended for the average oil operator. It gives a fairly simple explanation of some of the latest ideas about how to improve our oil-field finding.

Analysis of Oil-Field Waters.—The chief chemist, Gulf Oil Corp., Tulsa, and an associate outline practical working methods developed from long experience, furnish lists of reagents required and typical computations from actual laboratory cases.

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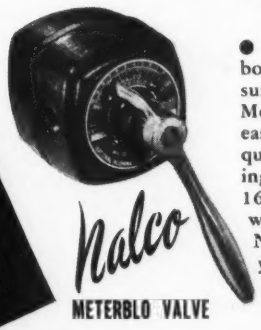

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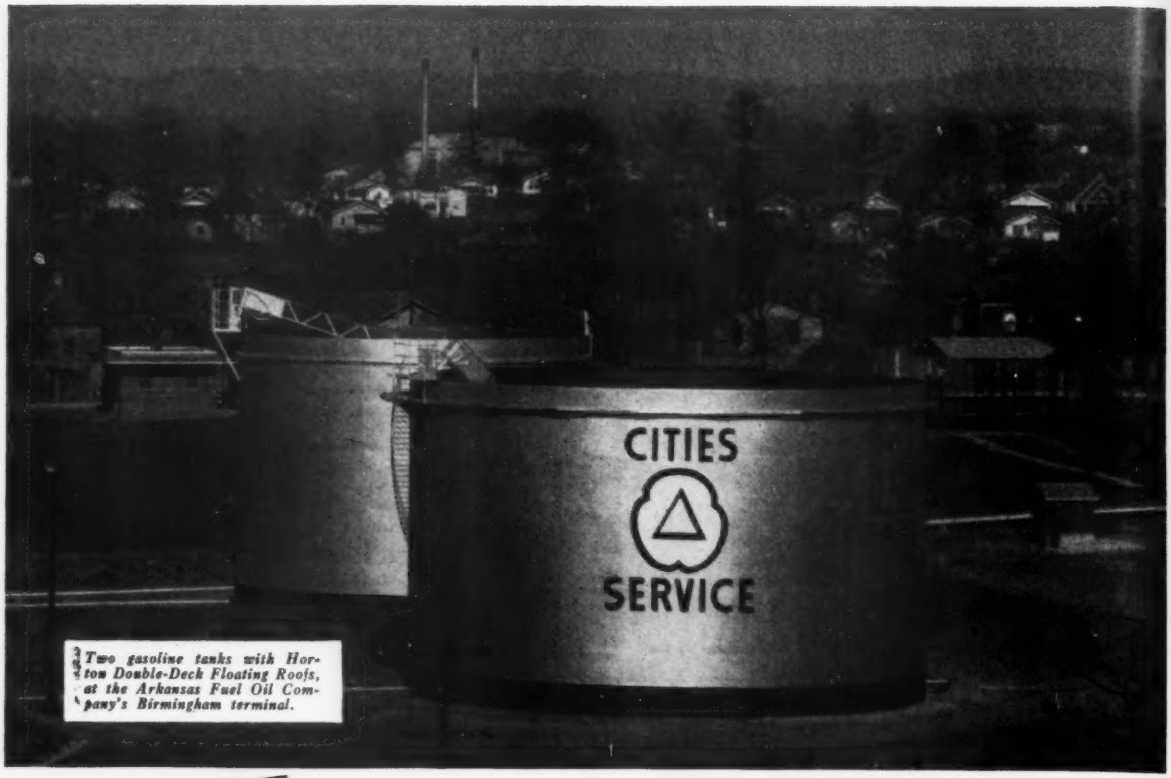
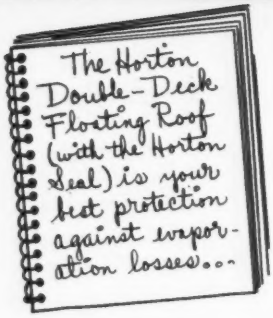


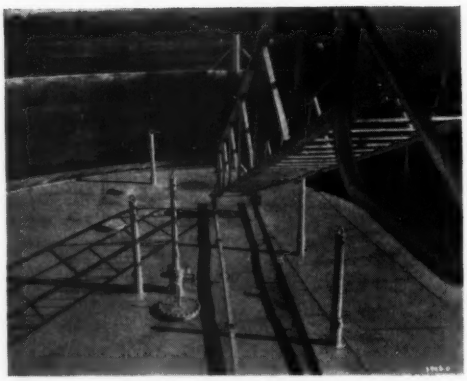
Two gasoline tanks with Horton Double-Deck Floating Roofs, at the Arkansas Fuel Oil Company's Birmingham terminal.



ECONOMY Note for MARKETERS

The Horton Double-Deck Floating Roof completely eliminates "filling losses", and greatly reduces "breathing losses". When used on tanks which are frequently refilled, the Horton Floating Roof can do away with unnecessary evaporation expenses. For instance, an 80,000-bbl. fixed roof tank, storing a 10-lb. motor gasoline, will lose 120 barrels in each filling—*there will be no filling loss from the same size tank equipped with a Horton Floating Roof.* The fixed-roof tank will also lose 1700 bbls. in one year by "breathing", and the Horton Floating Roof will cut this loss 180 bbls. What is the actual dollar saving here, figured from the cost-per-barrel of the products you handle?

Our Bulletin B has more cost figures, as well as engineering details. Write our nearest office for your copy.



Looking down on a Horton Floating Roof. Note the seal which closes the gap between the roof's edge and the tank shell. The vital parts of the Horton seal are completely enclosed and protected by the weatherproof fabric ring which is visible here.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

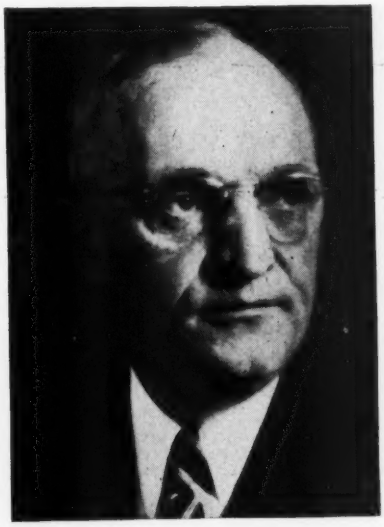
Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025-201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 14.....1423 Wm. Fox Bldg.
New York, 6.....3347-165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
Salt Lake City, 1.1525 First Security Bank Bldg.
San Francisco, 11..1254-22 Battery Street Bldg.
Seattle, 1.....1325 Stuart Bldg.
Tulsa, 3.....1606 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Compania Tecnica Industrie Petroli, S.A.I., Rome, Italy
Leopoldo Sol & Cia., Reconquista 558, Buenos Aires, Argentina
Wheeloe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Chicago Bridge & Iron Company, Limited, Apartado 1348, Caracas, Venezuela

PERSONALS

E. F. BATTSON



W. H. FERGUSON

Continental Names Battson to Succeed Ferguson as Rocky Mountain Head

EFFECTIVE February 1, 1949, E. F. Battson, New York vice president for Continental Oil Co., will succeed W. H. Ferguson, executive vice president, Denver, Colo., as vice president and manager of Continental's operations in the Rocky Mountain area.

Appointment of Battson to his new position marks a return for him to the Rocky Mountain area. After joining Continental in 1922 at Delta, Utah, and later serving at Richfield, Utah, he was promoted to assistant division manager at Butte, Mont., becoming manager at Butte in 1929.

Leaving Butte in 1932 Battson was promoted to assistant general sales manager, Kansas City; northern sales manager, Chicago; eastern sales manager, New York; and in 1946 was appointed assistant to the president. He was selected vice president early this year.

In addition to being an officer or director of several subsidiaries and affiliates of Continental Oil Co., Battson is currently a member of Continental's management committee and is chairman of the advertising committee.

Ferguson, who will officially retire February 1, will continue as a member of the Continental board of directors. A native of Pittsburgh, Pa., Ferguson received his bachelor's degree at Washington and Jefferson College, Washington, Pa., in 1905, and his law degree at Denver Law School 3 years later. Prior to joining Continental in 1922 he handled legal matters for Continental Oil Co. as a member of a Denver law firm. Ferguson served as a director and general counsel until his election as vice president in 1929 and executive vice president the same year. He has also served as officer and director of numerous Continental subsidiaries and affiliates.

L. L. AITKEN, JR.

L. L. Aitken, Jr., executive assistant to **W. H. Ferguson,** manager of the Continental Oil Co.'s operations in the Rocky Mountain area, will be promoted to assistant manager of operations in that area with headquarters in Denver, Colo., effective February 1. Aitken, who had been associated with Continental as an attorney in Denver for 10 years, was promoted in July this year as executive assistant to Ferguson.

Ralph Booker, with the Indiana Farm Bureau, oil division, will resign January 1 to join Rock Island Refining Co. at Indianapolis, Ind.

Ed Riddle, who has been with Texas Pacific Coal & Oil Co. in Wyoming, has joined the company's geological department of the Permian basin district office in Midland, Tex.

R. G. Heard, who has been with affiliates of Standard Oil Co. (N. J.) for 25 years, has been appointed assistant manager of Esso Export Corp.'s marine fuel oil sales department.

Bernard N. Darbyshire, petroleum economist in the trade relations department at the head office of Shell Petroleum Co., Ltd., in London, has joined the Moore & Carleton Group of companies and becomes manager of the London office of Harold Moore & Partners (Engineers), Ltd., and the representation of Moore & Carleton, petroleum consultants.

Dr. H. H. Power, University of Texas petroleum engineering department chairman, has been named to a subcommittee of the Engineer Council for Professional Development, to consider accrediting schools in other American republics. He and other committee members will visit Latin-American engineering schools at the request of the schools' deans, and inspect the institutions for accreditation.

Newly-elected directors of the Houston Chamber of Commerce include: **John C. Flanagan,** vice president and general manager, Texas operating division, United Gas Corp.; **C. E. Naylor,** president, Maintenance Engineering Corp.; **J. A. Neath,** vice president, Humble Oil & Refining Co.; **Gardiner Symonds,** president, Tennessee Gas Transmission Co.; **R. B. Kahle,** president, Eastern States Petroleum Co.; **Douglas Marshall,** vice president, Quintana Petroleum Corp.; and **Walter B. Van Wart,** vice president, Wyatt Metal & Boiler Works.

D. Y. Hewitt, of Mount Pleasant, Mich., has been named executive vice president and a director of Leonard Pipe Line Co. Hewitt had recently resigned as vice president and director of Simrall Corp. In his new position Hewitt will assume many of the duties formerly administered by **David E. Beach,** who resigned last May as head of Leonard Pipe. **John J. Devine,** who has been serving as acting general manager of the Leonard company, was named general manager and a director of the company. Other directors elected to the board at the annual meeting recently were: **J. Walter Leonard,** president and director; **Grant L. Cook,** secre-

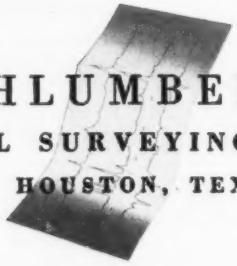
Chapter Eleven of The Schlumberger Story

New Horizons

Toward the sundown of each year since its incorporation, Schlumberger has been able to look back upon another period of progress.

New means have been put in the field to practice and improve Schlumberger oil field services . . . New services have been added to those in the field which now total seventeen . . . New facilities for research have been added to aid the oil industry at large.

The Schlumberger story has been one of constant striving toward being a service company of the highest technical, moral, and commercial standards. Today Schlumberger is proud but not complacent of its record and looks toward "new horizons" of service and development.



SCHLUMBERGER

WELL SURVEYING CORP.

HOUSTON, TEXAS

tary-treasurer and director; **David E. Beach** and **Bernard M. Jones,** directors.

W. M. V. Ash, formerly general manager of United British Oilfields of Trinidad, Ltd., has succeeded **P. M. Fowlie** as president of the Shell Company of Canada, Ltd. Fowlie has taken an appointment with the Shell organization in London. Ash joined Shell in London in 1929 and subsequently served in Egypt, Syria, and in the United States where he was assistant to the vice president of Shell Oil Co., Inc. In 1942-43 he was for a time in charge of drilling in Alberta and in 1945 went to Trinidad.

T. K. BOWLES

Thomas K. Bowles, who for the past 3 years has been doing specialized work for the chief geologist in Houston, Tex., for Ohio Oil Co., has been appointed assistant chief geologist for the company and will begin his new duties in the general office in Findlay, Ohio, January 1. He will assist **Paul L. Henderson,** chief geologist, in directing the general operations of the company's geological department. Prior to his assignment in 1945 to Houston, Bowles served as district geologist at Bakersfield, Calif.

David L. Campbell, manager of the Calgary, Alta., refinery of British American Oil Co., Ltd., has been appointed manager of all refineries for the company with headquarters in Toronto. A native of Nokomis, Sask., Campbell attended school there and later graduated from the University of Saskatchewan with a bachelor's degree in chemical engineering. He joined British American in 1934 as instrument man in the Calgary refinery.

Dr. Richard V. Hughes, of Bradford, Pa., director of production research for the Pennsylvania Grade Crude Oil Association since 1944, has resigned to accept a research and teaching position at Standard Research Institute, Palo Alto, Calif.

S. B. Fowler, who has been in charge of the Midland, Tex., office of Wood River Oil & Refining Co., has been promoted and transferred to the company's headquarters at Wichita, Kans., to become assistant to the manager of crude-oil purchasing, exchange and trade, and pipeline departments. **C. H. Roberts, Jr.,** succeeds Fowler as manager of the Midland office.

Richard S. Stewart, operations manager for the manufacturing department refineries and plants since 1945 for Standard Oil Co. (Ohio), has been appointed assistant to the executive vice president of the company, effective January 1. Stewart joined Sohio in 1938 after 6 years' experience in engineering with The Texas Co. in Texas. During the early part of the war, he was the company's representative to the Petroleum Administration for War in matters concerning the construction of Sohio's aviation gasoline refining units, and later was on special assignment to the Navy.

Other promotions in the company's manufacturing department's four refineries and home office include: **Wallace K. Bergen,** manager of Sohio's refinery at Toledo, to succeed Stewart as operations manager with offices in Cleveland; **Ivan L. Peterson,** manager of the refinery at Lima, to become manager at Toledo, where he was first employed by Sohio in 1924; **Seward R. Bolles,** manager of the refinery at Latonia, Ky., to become manager of the Lima refinery; **Edward S. Bale,** general superintendent at Cleveland No. 1 refinery, to become manager of the Latonia refinery; **James S. Dalton,** general superintendent at Latonia refinery, to become general superintendent at Cleveland No. 1 refinery; **Ray Elo,** who joined Sohio in 1934 at Latonia, to become plant superintendent there; **Joseph August,** chief of the technical service division in Cleveland, to become technical superintendent of the Lima refinery; **Donald G. Stevens,** who joined Sohio in 1941 to become chief of the technical service division of the manufacturing department; **Edward N. Salathe,** chief engineer at Cleveland No. 1 refinery to succeed Stevens as supervisor of the design and construction section of the general engineering division at Cleveland; and **Norman C. Fuller,** who started at Cleveland No. 1 refinery in 1946, to succeed Salathe as chief engineer at Cleveland No. 1 refinery.

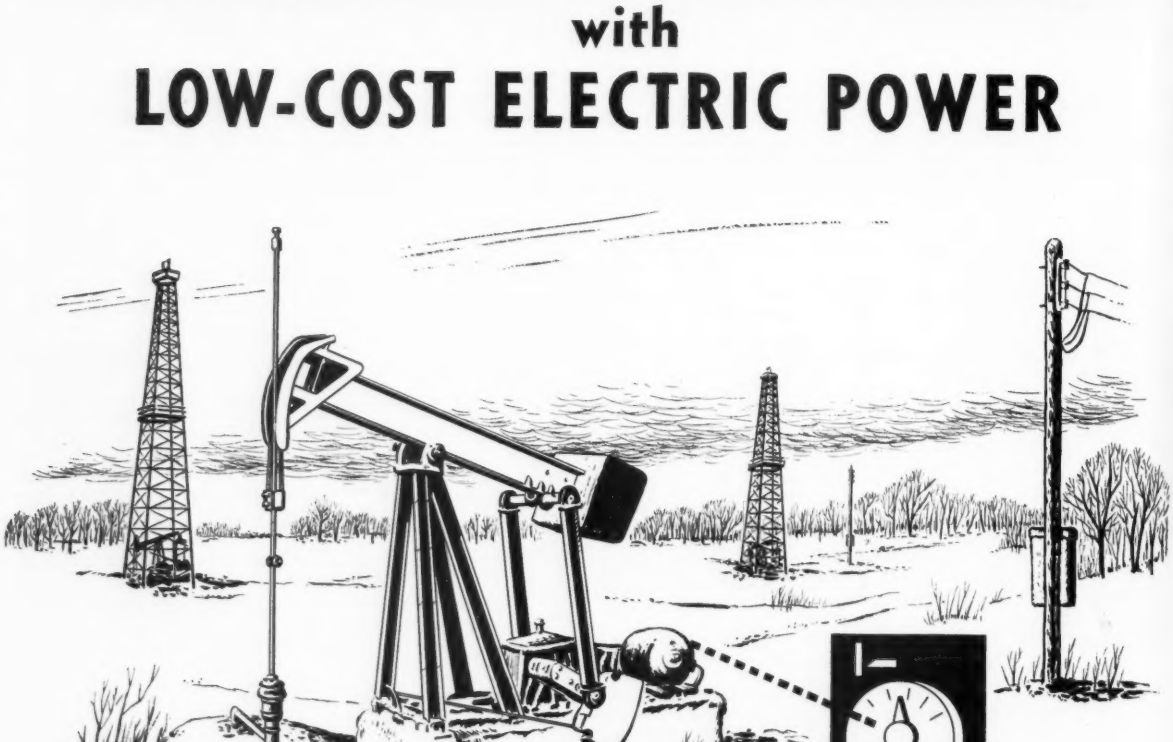
R. W. PARKER

R. W. Parker, formerly assistant chief engineer, general engineering, of Standard Oil Co. of California, has been named assistant chief engineer, construction and maintenance, of California Texas Oil Co., Ltd. Parker, a 1923 graduate of the University of British Columbia, was employed by General Petroleum Co. and Union Oil Co. of California until 1930 when he joined California Standard. In 1945 he became chief engineer of the manufacturing department of California Standard.

Other appointments announced by Caltex are: **W. E. Tucker,** to assistant chief engineer, designs, and **J. W. Thomas,** to petroleum engineer. Tuck-

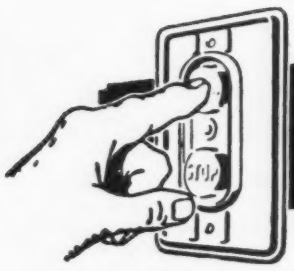
Shown here conferring on foreign exploration activities of Stanolind Oil & Gas Co. are: G. T. Buskirk, division geologist, Bogota, Colombia; C. T. Jones, manager, foreign exploration department; G. B. Jenkinson, Jr., assistant manager, foreign exploration department; and C. F. Schock, division landman, Calgary, Alberta, Canada. Buskirk and Schock arrived in Tulsa recently for a discussion of foreign exploration activities of the company

ELIMINATE *Wintertime* WORRIES
with
LOW-COST ELECTRIC POWER



A pump operating on low-cost electric power knows no season. Electric motors start easily and quickly — your well maintains maximum efficient production in any and all kinds of weather. No burst radiators; no frozen fuel-supply valves; no costly engine trouble and down time due to condensation in fuel lines. Avoidance of winter delays means more dependable year-'round, all-weather operation . . . major savings in money and man power made possible by low-cost electric power.

Electric Power offers you



HOUSTON LIGHTING & POWER COMPANY

VERSATILITY
ECONOMY
DEPENDABILITY
FLEXIBILITY
SIMPLICITY

er, a graduate of Dartmouth, joined California Standard in 1942 as an engineer and has been employed by Caltex since 1944. Thomas, who was graduated from the University of Washington in 1938 with a geology degree, was employed by California Arabian Standard Oil Co. in Arabia from 1938 to 1941 and since 1941 has worked with California Standard doing geological and petroleum engineering work in California and Washington.

RICHARD BARD

Richard Bard, who has been on an assignment with the regional gas-gasoline staff of Shell Oil Co., Inc., at Houston, Tex., has been appointed manager of Shell's gas-gasoline department in the Tulsa area to succeed **V. E. Middlebrook,** who resigned December 1. Bard, who graduated from Ohio State University, has had a wide background of over 18 years in various phases of the industry relating to refining, marketing, transportation, and supplies.

Clyde S. Gould, formerly district engineer at Drumright, Okla., for the United States Geological Survey, has been promoted to deputy supervisor with offices in Tulsa. He succeeds **Edgar M. Pilkinton,** who was recently transferred to Washington, D. C. **Glenn R. V. Griffith,** district engineer at Tulsa, has had his territory enlarged to include the Drumright area, and **Marshall F. Stiles, Jr.,** engineer at Oklahoma City, has been transferred to Tulsa.

Gage Lund, who has been chairman of the board of The California Co. and Standard Oil Co. of Texas, and a director of Standard Oil Co. of California, has been elected a vice president of Standard of California. Lund, who joined Standard in 1925 after graduating from Stanford University, worked as a geologist and drilling foreman in the Rocky Mountain area and Texas for 11 years and then was made division superintendent of California Co.'s Gulf Coast division in Houston. He became assistant manager of all operations of The California Co. and of Standard Oil Co. of Texas in 1938. Three years later he was elected president of the California Co.

E. H. Walker, general manager of Shell Oil Co., Inc.'s, personnel and industrial relations organization, has been appointed a vice president. After joining Shell in 1932, Walker served in the engineering department and in various operating departments before transferring to St. Louis, Mo., in 1936 as personnel assistant in the manufacturing department. In 1940 he was named manager of the personnel department, with offices in New York, and 3 years later became general manager of personnel and industrial relations.

W. S. S. Rodgers, chairman of the board of The Texas Co. headed a group of company officials who visited some of the company properties in Texas and Oklahoma last week. Other members of the party included: **R. Ogarrio,** vice president, New York; **J. S. Leech,** vice president, Houston; **R. B. McLaughlin,** president, The Texas Pipe Line Co., Houston; **E. R. Filley,** manager of production department, Houston, and **E. C. Breeding,** comptroller, New York. In Oklahoma they were joined by **M. J. Heald,** manager, and **J. W. Foley,** assistant manager of the Oklahoma division.

SHIFTS—

Norman A. Nelson, engineer, Humble Oil & Refining Co., Lolita to Houston, Tex.; **Paul Johnson,** foreman, Continental Oil Co., Conroe, Tex., to Lucedale, Miss.; **R. J. Tilton,** engineer, Humble Oil & Refining Co., Genoa to Brownwood, Tex.; **Marshall R. Pullen,** engineer, Hunt Oil Co., Henderson, Tex., to Haynesville, La.; **James I. Trott,** engineer, Stanolind Oil & Gas Co., Odessa to Midland, Tex.; **A. W. Goodson,** foreman, Danciger Oil & Refining Co., Wharton to Boling, Tex.

Raymond B. Kelly, Jr., engineer, Sid W. Richardson, Inc., Bunkie to New Orleans, La.; **John W. Hinckley,** engineer, The California Co., Harvey, La., to Ardmore, Okla.; **W. J. Korinek,** engineer, The Texas Co., Morgan City, La., to Houston; **L. T. Moffitt,** engineer, Sunray Oil Corp., Tulsa to Madison, Kans.; **William L. Brown,** engineer, Sinclair Prairie Oil Co., Wewoka, Okla., to Carmi, Ill.; **G. L. Helmke,** geologist, Stanolind Oil & Gas Co., Craig, Colo., to Casper, Wyo.; **W. R. Goodier,** engineer, Shell Oil Co., Inc., Oklahoma City to Great Bend, Kans.

DEATHS

Edward H. Lynch, 49, oil transportation executive, died December 4 in Philadelphia, Pa. He was president of Lynch Brothers Co., operators of a fleet of oil barges, and was general manager of Lea River Lines, handlers of oil shipments on the Mississippi.

Robert D. Tucker, 68, retired port captain at the Providence refinery for Socony-Vacuum Oil Co., Inc., died December 2 while visiting in Montreal, Canada.

Henry Edward Billman, 66, president of Sterling Drilling Co., Sterling, Kans., and president of Rock Hill Petroleum Co., St. Louis, Mo., died December 9 in Wichita, Kans.

C. R. Washburn, engineer for Lone Star Gas Co., was killed December 8 in an automobile accident near Wichita Falls, Tex.

George Ralph McCray, 63, Titusville, Pa., oil producer, was killed in an automobile accident recently near East Titusville, Pa.

Charles Allen Wadsworth, 59, Midland, Tex., oil operator, was killed in an automobile-train accident, December 7, near Pecos, Tex.

Earl Woodard, 68, independent oil and gas producer of Oklahoma, died December 8 in Dewey, Okla.

Guy E. Wortham, 63, chief oil rater for the Texas Fire Insurance Commission, died December 7 in Austin.

A. L. Hull, 66, recently retired from the legal staff of Continental Oil Co., died December 9 in Ponca City, Okla.

Alfred Carl Elter, 56, chief division gager, Humble Oil & Refining Co., died December 5 in Corpus Christi, Tex.

George C. Probst, 89, pioneer independent oil producer of Oklahoma, died December 13 in Tulsa.

Theodore M. Cooper, 61, independent Osage County, Oklahoma, oil producer and drilling contractor, died December 7 in Tulsa.

PHYSICAL PROPERTIES OF LABORATORY-Prepared Drilling Muds AND THEIR MODIFICATION BY DRISCOSE

by H. B. Fisher and P. G. Carpenter**

SINCE the control and maintenance of the physical properties of oil-well drilling muds is always a serious problem to mud engineers, the advent of a new mud additive which can be used to facilitate this control is a matter of interest. A comparatively new product as an additive exists in a water-dispersible cellulose derivative which is described chemically as sodium carboxymethyl cellulose (NaCMC)†. Preliminary information on the composition and general mud treating properties of NaCMC has been given in an article by H. H. Kaveler[2] while J. R. Pettigrove[3] has discussed the field application of Driscose.

The function of this paper is to present specific information on the changes in physical properties of drilling muds when the muds are treated with NaCMC, and the modifications of the properties of the treated mud that can be expected when electrolytes are added to the muds. A limited amount of data are presented on the effect of temperature, aging, and treatment by various chemicals on NaCMC-treated muds. More details on some of these aspects will be presented in forthcoming publications. All experiments have been made on "synthetic drilling muds." These synthetic muds, designated as drilling muds in this article, are laboratory-prepared aqueous dispersions of clays and weighting agents and contain the essential ingredients of field muds.

*Phillips Petroleum Co. research department, Bartlesville, Okla.

†Sold under trade name "Driscose," by Drilling Specialties Co., Bartlesville, Okla.[1]

Summary

The outstanding property of NaCMC in drilling muds is its ability to lower the filtration rate. This ability is shown to vary with the kind and amount of solids present in the mud. In general, NaCMC in amounts of 0.5 to 1.0 lb. per barrel in fresh-water laboratory-prepared muds reduce filtration rates from values of 30 to 70 cc. (A.P.I.) to near 10 cc. And 2-lb.-per-barrel dosages produce fluid-loss values of approximately 5 cc. A limiting value in the order of 3 cc. is realized with higher concentrations of NaCMC.

Field experience with NaCMC has, in general, shown significantly better reductions in filtration rates of drilling muds by NaCMC than can be realized in laboratory tests. The answer to this probably lies in the wide range of effectiveness of NaCMC as shown in Figs. 1 and 2 herein. Field muds are conditioned to their best properties and generally contain a good particle-size distribution and hence are more susceptible to improvement.

The water-loss-reducing capacity of NaCMC in muds is impaired by electrolytes such as calcium sulfate and sodium chloride unless the mud is treated with caustic and quebracho.

In some muds having a fairly low water loss (muds containing clays such as Wyoming bentonite and Rogers Lake clay), NaCMC contributes considerably to the viscosity and gel strengths, more than can be expected from the combined individual viscosity effects of the NaCMC and clay. These viscosity and gel-strengths effects can be eliminated by water dilution or by treatments with caustic and quebracho. In a limited number of muds, NaCMC can be advantageously used to control the viscosity and gel strengths and in most cases improves the thixotropic properties.

NaCMC-treated, fresh-water muds maintain essentially stable properties when subjected to heating, a slight decrease in viscosity and gel strengths being evident. In NaCMC muds of

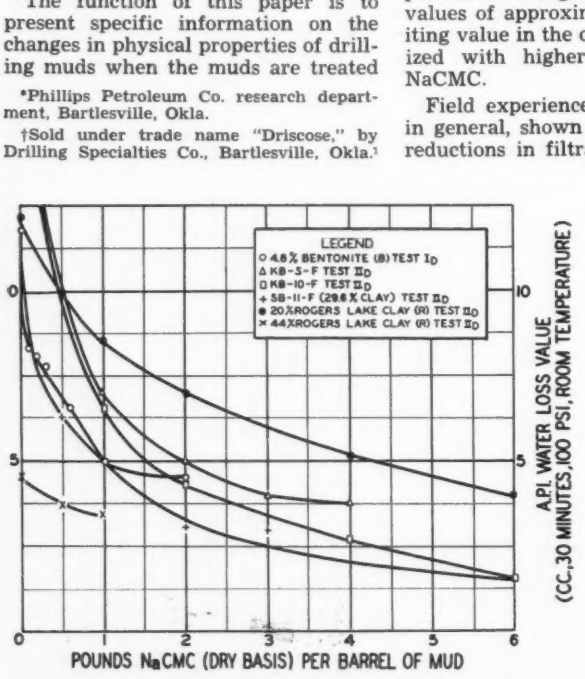

LEGEND
○ 4.8% BENTONITE (B) TEST I_D
△ KB-5-F TEST II_D
□ KB-10-F TEST II_D
+ 5B-11-F (29.6% CLAY) TEST II_D
● 20% ROGERS LAKE CLAY (R) TEST II_D
× 44% ROGERS LAKE CLAY (R) TEST II_D
A.P.I. WATER LOSS VALUE (CC., 30 MINUTES, 100 PSI, ROOM TEMPERATURE)
POUNDS NaCMC (DRY BASIS) PER BARREL OF MUD

Fig. 1—The effect of sodium carboxymethyl cellulose (NaCMC) on the filtration rate (A.P.I.-Code 29) of laboratory-prepared mud systems

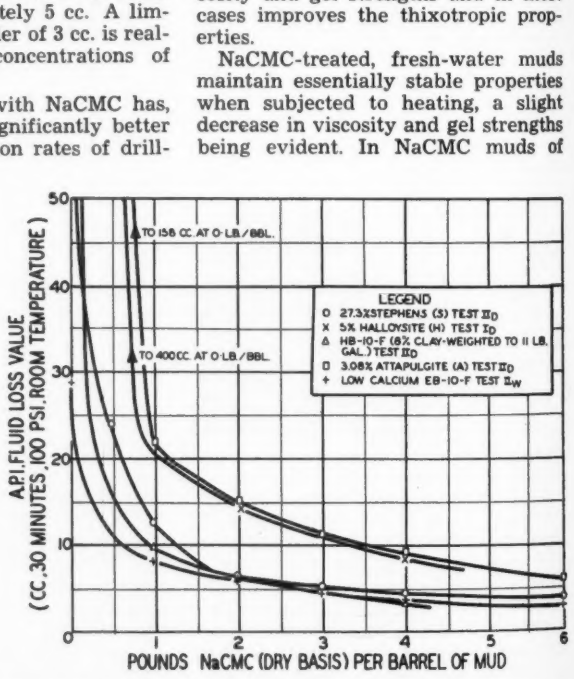

TO 158 CC. AT 0-LB./BBL.
TO 400 CC. AT 0-LB./BBL.
LEGEND
○ 27.3% STEPHENS (S) TEST II_D
× 5% HALLOYSITE (H) TEST I_D
△ HB-10-F (8% CLAY-WEIGHTED TO 11 LB. GAL.) TEST II_D
□ 3.08% ATTAPULGITE (A) TEST II_D
+ LOW CALCIUM EB-10-F TEST II_W
A.P.I. FLUID LOSS VALUE (CC., 30 MINUTES, 100 PSI, ROOM TEMPERATURE)
POUNDS NaCMC (DRY BASIS) PER BARREL OF MUD

Fig. 2—The effect of sodium carboxymethyl cellulose (NaCMC) on the filtration rate (A.P.I.-Code 29) of laboratory-prepared mud systems of comparatively high water loss value

normal pH which are contaminated with electrolytes, a decided decrease in viscosity and an increase in fluid loss occurs during heating. The increase in fluid loss occurs only in the low-NaCMC-dosage range and can be combated either by a higher concentration of NaCMC or by treatment with caustic and quebracho. The latter procedure is particularly applicable to muds containing calcium sulfate.

Experimental

A. Materials.—In most of the experiments reported herein, a low-viscosity grade of sodium carboxymethyl cellulose was used. This material is an air-dry product which contains 5 to 15 per cent moisture (loss in weight at 105° C.) and at least 95 per cent NaCMC on a dry basis. A 1 per cent aqueous dispersion at 20° C. gave a Stormer viscosity reading at 600 r.p.m. of 12.5 cp. A few experiments are reported in which a medium-viscosity grade of material was used (1 per cent aqueous dispersion at 20° C. gave a Stormer viscosity at 600 r.p.m. of 25 cp.). Both viscosity grades of material are similar as to purity, degree of substitution, and water dispersibility.

The medium-viscosity grade of NaCMC simulates the field material sold as Driscose. Use of medium-viscosity material in laboratory tests leads to a higher viscosity which is essentially eliminated in the field application because (1) the heating to which field muds are subjected leads to some viscosity degradation and (2) viscosities and gel strengths of muds may be modified by appropriate treatments with such agents as caustic and quebracho and polyphosphates. Mud dosages of NaCMC are expressed as pounds of dry product per barrel (42 gal.) of mud.

The laboratory prepared mud systems employed in tests contained various clays. These clays, followed by the symbols which will be used in describing muds, were:

1. Bentonite (B)—a commercial Wyoming type bentonite which has sodium montmorillonite as its major constituent.
2. Ezmix (E)—a native West Texas clay composed of the minerals montronite, calcite, dolomite, anhydrite, and quartz. Separate batches of this clay were found to vary slightly in composition.
3. Kaoline (K)—essentially the pure mineral kaolinite.
4. Halloysite (H)—the mineral halloysite chemically analyzes as a hydrated kaolinite but removal of the water of hydration does not give a mineral with the kaolinite structure.
5. Rogers Lake Clay (R)—a California clay composed of the minerals montmorillonite, calcite, and a small amount of quartz.
6. Attapulgite (A)—essentially the pure mineral attapulgite (magnesium aluminum silicate).
7. Stephens Clay (S)—a native West Virginia clay composed of 50-60 per cent of a montmorillonite-type clay (possibly beidellite since Al_2O_3 concentration is high) plus 30-40 per cent quartz.

Other chemicals were of reagent quality except for the quebracho which was a 72 per cent tannin extract sold by Thompson-Hayward Co., of Tulsa, and the barium sulfate used as weighting agent which was a commercial product sold for field use.

B. Preparation of muds for testing.—To obtain muds whose properties would not change significantly during any of the tests, large batches of mud were prepared by dispersing the clays in an Eppenbach QV-6 colloid mill. The clay-water systems were milled at a fine setting of the mill (No. 24—.0055 in.) for such a period of time that the mud viscosity remained constant over a 10-minute milling interval. Weighting agent, if present, was added by vigorous stirring after the milling operation and the prepared mud was subsequently aged for at least 24 hours prior to being used.

C. Composition of muds.—Table 1 lists a series of laboratory-prepared muds useful for evaluation tests. Under "Mud Designation," the capital letters refer to the clays so marked in the section on materials, while numerical subscripts refer to different supplies of clay which differed slightly in composition. A mud labeled EB-10-F means that there is a 10 to 1 weight ratio of Ezmix to bentonite made up in distilled or "fresh" water. A mud labeled EB-10-S refers to the same clay ratio but the water phase contains sodium chloride or salt. Roman numerals following mud designations differentiate between different batches of a given type of base mud which varied slightly in composition. Certain simple mud systems have not been listed in that their labels, such as B (5 per cent), which means a 5 per cent water dispersion of bentonite, amply describe their composition. It is also generally convenient to prepare base muds which require 20 per cent dilution with water to give the compositions listed in Table 1. The dilution water serves as a convenient means of incorporating solutions of treating chemicals into the mud.

D. Methods of testing NaCMC.—Various techniques are applicable for evaluating NaCMC in muds, variations existing in the method of incorporating NaCMC in the mud (as an air-dry powder or as a hydrated suspension), in the order of addition of electrolytes and NaCMC, and in the time and temperature of aging the treated muds prior to testing. Details on the various methods used in this work are shown in Table 2. When hydrated suspensions of NaCMC were used, base muds were used which when diluted by the added water gave the mud compositions listed in Table 1. The Roman numerals preceding the listed methods in Table 2 are used in tables containing mud evaluation tests to designate the test procedures.

The simplest procedure for evaluating NaCMC, described as I_D in Table 2, involves the addition of the air-dry NaCMC to the mud followed by 30 minutes' vigorous stirring on a commercial fountain-type mixer. Thirty minutes' high-speed stirring is more than sufficient time to realize complete dispersion of the NaCMC in muds. Muds so treated may be tested immediately according to the procedures outlined in A.P.I. Code 29 (July 1942). A preferred procedure, described as II_D in Table 2, is usually followed in that the final aging period of the treated mud will produce a mud of more stabilized properties, particularly if electrolytes are present. Slightly different mud properties are realized if the NaCMC is added as an aged hydrated suspension or as the air-dry powder. The air-dry powder technique tends to produce slightly higher initial mud viscosities and lower water-loss values.

TABLE 2—TEST PROCEDURES USED IN EVALUATING NaCMC IN DRILLING-MUD SYSTEMS

Fresh-water muds:
- I_D Add air-dry NaCMC to mud, stir 0.5 hour, and test.
- II_D Add air-dry NaCMC to mud, stir 0.5 hour, age 20 hours, restir 0.5 hour and test.
- II_W Add hydrated suspension of NaCMC to mud, stir 0.5 hour, age 20 hours, restir 0.5 hour, and test.

Salt-water muds; salt added after NaCMC:
- III_D Add air-dry NaCMC, stir 0.5 hour, age mud 20 hours, add NaCl, restir, age 20 hours, restir 0.5 hour, and test.
- III_W Add hydrated suspension of NaCMC to mud, stir 0.5 hour, age 20 hours, add salt, stir, age 2-4 hours, restir, and test.

Salt-water muds; salt added before NaCMC:
- IV_D Add salt to mud, stir, age 20 hours, add air-dry NaCMC, stir 0.5 hour, age 2-5 hours, restir 0.5 hour, and test.
- IV_W Same as IV_D except NaCMC added as hydrated suspension.

TABLE 3—THE EFFECT OF CAUSTIC AND QUEBRACHO ON A HIGH-VISCOSITY-FRESH-WATER MUD. MUD IS A 5.7 PER CENT WYOMING TYPE BENTONITE TREATED WITH 1 LB. PER BBL. OF MEDIUM VISCOSITY GRADE OF SODIUM CARBOXYMETHYL CELLULOSE (NaCMC)

Med. visc. NaCMC lb./bbl.	NaOH lb./bbl.	Quebracho lb./lb.	Physical properties* A.P.I. Code 29: Stormer visc. 600 r.p.m., cp.	Gel strengths (g): Initial	Gel strengths (g): 10 minute	Mud pH
0	0	0	17	0	35	8.5
1	0	0	70	2	80	8.3
1	0.5	0.25	74	2	55	8.4
1	1.0	0.25	62	1	45	9.1
1	1.5	0.25	55	1	45	9.6
1	2.5	0.5	50	0	35	9.8
1	3.0	0.5	46.5	2	30	10.2
1	4.0	2.0	48	0	35	12.8
1	5.0	2.0	43	0	40	12.9
1	6.0	2.0	45.5	0	35	13.0

*Mud treated with NaCMC, stirred 0.5 hour, treated with caustic and quebracho, stirred 0.5 hour, and tested.

TABLE 1—COMPOSITION OF LABORATORY-PREPARED DRILLING MUDS USED IN EVALUATION TESTS

Mud designation—	Per cent by weight of constituents*: Ezmix	Kaolin	Bentonite	$BaCO_3$	$BaSO_4$	NaCl	H_2O	$CaSO_4$
Low calcium EB-10-F	8.10	....	0.80	0.80	26.3	....	64.00	....
Low calcium EB-10-F	6.42	....	0.64	0.64	26.3	....	66.00	....
Low calcium EB-10-S	7.2	....	0.70	0.70	23.4	11.00	57.00	....
EB-10-F	8.80	....	0.90	....	26.3	....	64.00	....
EB-10-F (I)	7.00	....	0.70	....	26.3	....	66.00	....
EB-10-F (II)	7.97	....	0.80	....	26.3	....	64.80	0.17
EB-10-S	7.82	....	0.80	....	23.40	11.00	57.00	....
KB-10-F	....	20.00	2.00	....	17.50	....	60.50	....
KB-10-S	....	17.8	1.8	....	15.60	11.00	53.80	....
KB-5-F	....	10.6	2.1	....	12.70	....	74.60	....

*Solids are weighed in as air-dry products.

Results and Discussion

The most outstanding property of sodium carboxymethyl cellulose (NaCMC) in fresh-water mud systems is its remarkable capacity for reducing the filtration rate. (See Figs. 1 and 2.) It is apparent that without

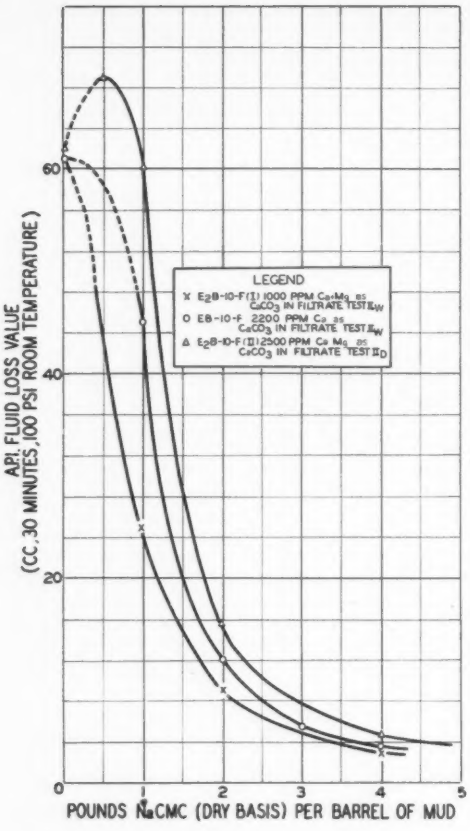


Fig. 3—(Left) The effect of sodium carboxymethyl cellulose (NaCMC) on the filtration rate (A.P.I.-Code 29) of laboratory prepared mud systems containing high concentrations of soluble calcium and magnesium salts

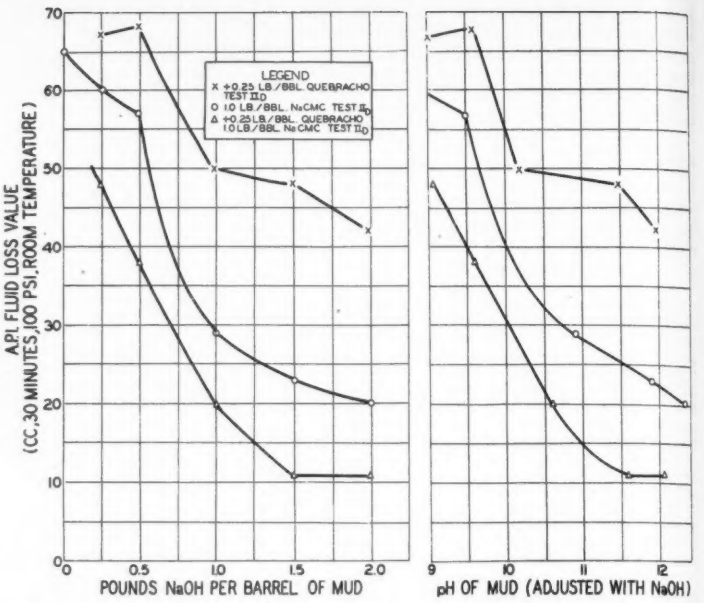

API. FLUID LOSS VALUE
(CC, 30 MINUTES, 100 PSI, ROOM TEMPERATURE)
LEGEND
POUNDS NaOH PER BARREL OF MUD
pH OF MUD (ADJUSTED WITH NaOH)

Fig. 4—(Above) The effect of NaCMC, quebracho, and NaCMC plus quebracho on the A.P.I. Code 29 fluid loss value of a high calcium mud treated with various amounts of sodium hydroxide

exception the material causes an appreciable reduction in the fluid loss and that the magnitude of the effect is dependent to some extent on the type of solids found in the muds. The muds tested cover a wide range of compositions from the easily suspended Wyoming type bentonite to normally nonsuspending materials such as the minerals halloysite and barium sulfate. Additional studies will be required to explain the differences in the effectiveness of NaCMC in reducing the filtration rates of systems containing various types of solids. It is evident, however, that the material has wide application as a water-loss reducer because of the diverse systems in which such an effect is observed.

Many times during actual field drilling operations the muds employed become contaminated with electrolytes because of the formations drilled. Sodium chloride may enter the system as the result of drilling through rock salt sections or because of a salt-water-bearing formation. Calcium sulfate is a common contaminant since many wells are drilled through anhydrite or anhydrite-bearing formations. Magnesium salts are also encountered as the result of salt-water flows.

If untreated bentonitic muds encounter such contamination, the desirable properties are normally destroyed because of flocculation of the mud. Abnormally high water losses are observed and other mud properties are affected. The inclusion of NaCMC in such muds tends to minimize the effect of contamination by electrolytes and good properties can be maintained in the mud with appropriate treatment.

The effect of NaCMC on calcium and magnesium - salt - contaminated muds on fluid loss results have been plotted in Fig. 3. Increasing amounts of such contaminants result in a less efficient water-loss reduction in the lower ranges of NaCMC concentration but at the higher concentrations of NaCMC the water-loss values are greatly reduced.

While NaCMC functions as a water-loss reducer in the presence of soluble calcium and magnesium salts, its maximum effectiveness is realized only upon additional chemical treatment of the mud. The fluid-loss values for various test conditions, plotted on Fig. 4, exhibit a minimum at mud pH values of 11.5 and higher. It is apparent from Fig. 4 that muds treated with caustic and quebracho and caustic and NaCMC also show a lowering in water loss value. Minimum water-loss values, however, are obtained with a combination of the three agents. The data on the low calcium EB-10-F mud demonstrate that caus-

(Continued on page 98))

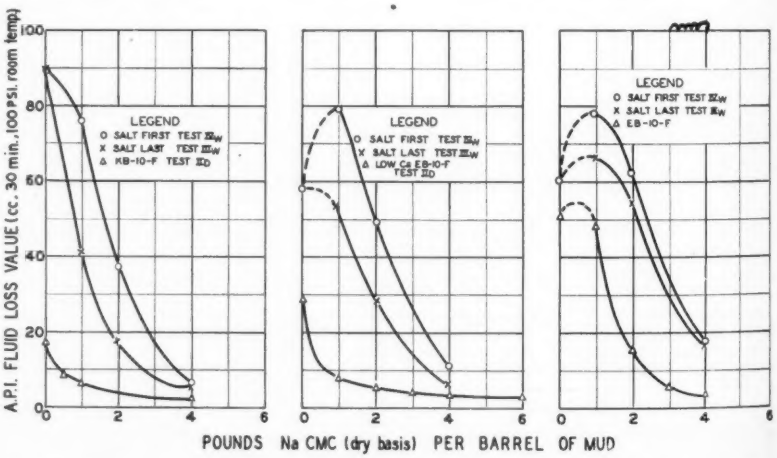


Fig. 5—The effect of high sodium chloride concentration on laboratory-prepared drilling mud systems treated with sodium carboxymethyl cellulose (NaCMC). Salt added prior to and after addition of NaCMC

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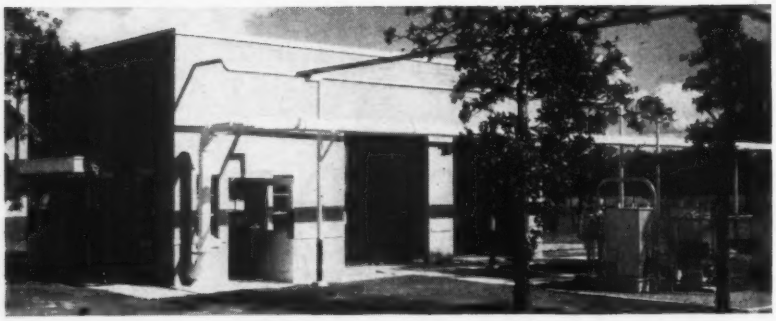


View of Sheridan pump station showing openings to provide ventilation through the building

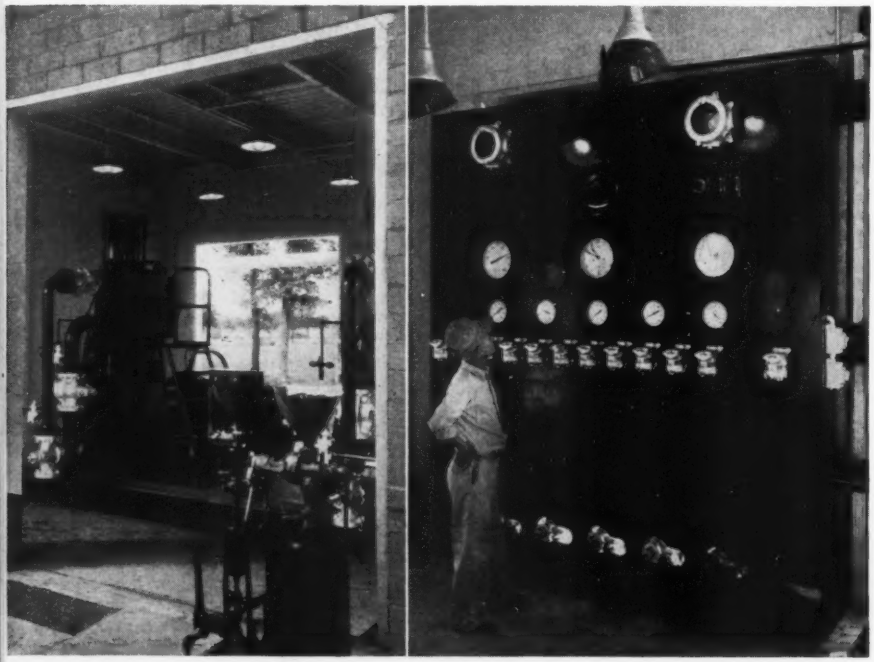
Shell Line Moves Sheridan Cycling-Plant Products to Refinery

by Paul Reed

THE Sheridan cycling plant in Colorado County, Texas, built and operated by Shell Oil Co., Inc., produces about 5,500 bbl. per day of fractionated condensates including propane, isobutane, normal butane, isopentane, gasoline, and residual distillate. The increasing need for these products at Shell's Deer Park refinery justified the construction of a pipe line 101 miles in length.

It was recognized that the initial supply of 5,500 bbl. per day in continuous operation would move at a critically slow rate through 6-in. pipe, but the use of smaller pipe would preclude any future expansion of business. The final decision was to build a 6-in. line and one pumping station to operate at an initial rate of 7,700 bbl. per day for 5 days per week and remain "pressure packed" for 2 days per week. Properly scheduled, the 6-in. line would add 19,000 bbl. of working-pressure storage to that already available at Sheridan and Deer Park.

Standard-weight seamless and electric-weld pipe was used throughout. Joints were made by conventional arc welds, and in rivers the joints were reinforced with welding sleeves.



External corrosion is prevented by a coating of coal-tar enamel with imbedded glass-fiber mat and bonded asbestos paper wrapper, plus cathodic protection. SCIP, the Shell process of inhibiting products lines against internal corrosion, has been used since the line was first placed in operation. Plug scrapers are run in pairs once a week.

Line block valves were installed at river crossings and such other points as necessary to permit isolation of sections not to exceed 15 miles in length. As industrial or residential construction encroaches on the line, additional valves will be installed.

At Sheridan, electric-motor-driven centrifugal booster pumps, set adjacent to storage tanks, deliver the products to the main-line pump station through separate lines, one for each product. Valves for switching different products into the pump suctions are mounted in the lower panel of the main-line gageboard. Booster-pump operations are controlled through remote push-button stations mounted immediately above the product-switching valves. The booster-pump starters are electrically interlocked with the starters of the main-line motors to prevent starving of the main-line pumps.

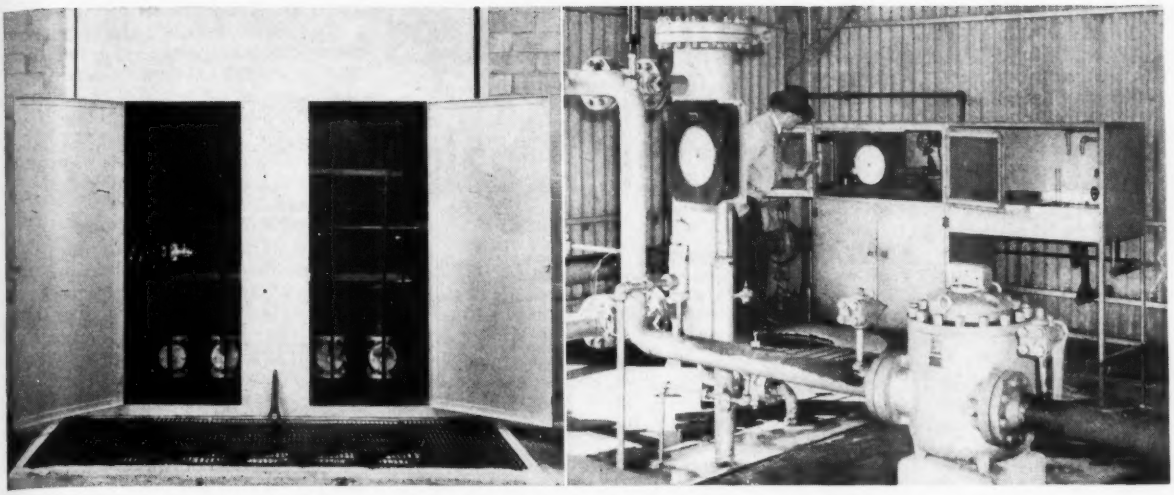
Main pumping equipment consists of two vertical-triplex pumps, each fitted with plungers to displace 8,000 bbl. per day and each driven by 125-hp. constant-speed explosionproof electric motors. Constant-speed equipment was selected because it seemed more important to maintain a uniform delivery rate at variable pressures than to maintain constant pressure at variable pumping rates.

Protective equipment at Sheridan includes:

1. Electrical interlock between tank-farm booster pumps and main-line pumps.
2. Two mercury-tube low-flow indicators with cutouts to shut down booster and main-line pumps when rate of the flow drops to 85 per cent of normal.
3. Thermal alarms and cutouts actuated when the temperature in the pump-chambers rises to 150° F.
4. Mercoid switches to shut down booster and main-line pumps when discharge pressure exceeds the predetermined maximum.
5. Thermal protection against overheating of motor bearings or windings.

The pumphouse is of structural hollow tile with glazed finish inside and scratch finish outside. To insure thor-

Extreme left: Two electric-driven vertical triplex pumps. In the foreground are injectors for dye and inhibitor. Left: Gage board at Sheridan station. Valves for switching different products are mounted in the lower panel. Immediately above are remote push-button stations for controlling booster pump operations



Left: Rear view of gage board showing doors which may be opened to afford ready access to equipment. Right: Gravitometer and fluid meters at Deer Park terminal

ough ventilation of the pump room, wall panels were omitted in the direction of prevailing winds. A completely enclosed office space in one corner of the building gives necessary protection to the operating personnel.

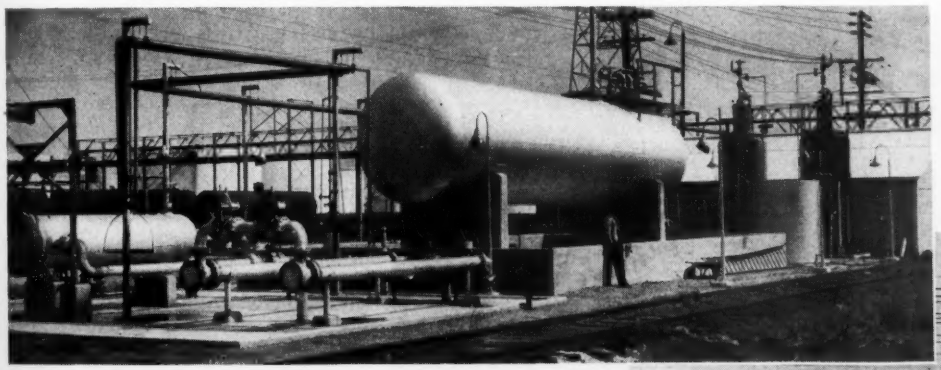
Equipment at the Deer Park terminal consists principally of filters, meters, meter provers, and the manifold for switching products. Primary filtering equipment includes a hay tank and wire-cloth basket-type strainer. The positive-displacement meters are further protected by felt filters. Metering is done with two Smith positive-displacement meters, which are proven by the dual-tank water-displacement method in accordance with A.P.I. Tentative P.D. Meter Code No. 1101.

Dye-injection equipment was installed at Sheridan and a suitable illuminated sight gage was installed at Deer Park; however, the close correlation between gage measurements at Sheridan and meter measurements at Deer Park has made the use of dye plugs unnecessary. Product cuts at Deer Park are made on specific gravity as recorded by an Anubis gravitometer.

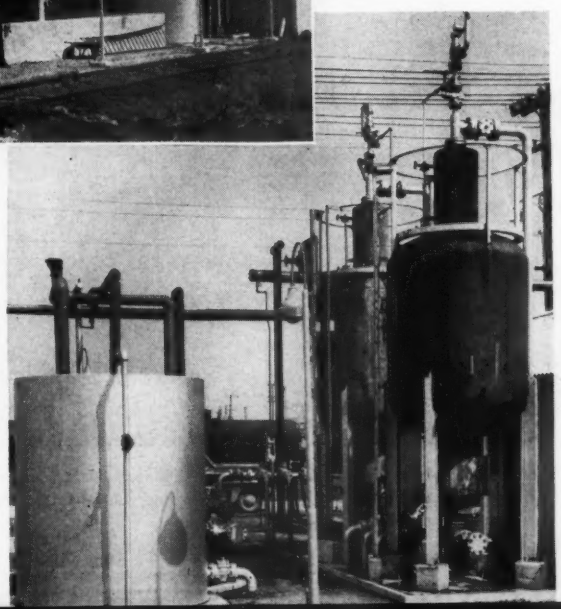
Batch sizes vary between 1,000 and 13,000 bbl., and usually there are four or five in the line. The week-end shutdowns are made on schedule without reference to what particular products may be in the line. There is no measurable increase in length of interbach contamination between batches that have moved continuously and those that are stopped in transit.

Although Sheridan station and Deer Park terminal are equipped to handle propane, this product is currently shipped by tank car to destinations other than Deer Park. Backpressure regulators at Deer Park are set at 125 psi. This pressure is higher than is ordinarily necessary for butanes, but it is required in this instance to keep them from flashing in the line at higher elevations if flow should stop for any cause. When the line is packed for the 2-day week-end shutdown, the block valve at Deer Park is closed and the line is pressured by the Sheridan pump to 800 psi., after which the Sheridan block valve is closed. Normally, the pressure subsides to 500-425 psi. within a short period and then remains constant the rest of the weekend.

From Sheridan the line runs to a point adjacent to Katy cycling plant and then parallels Shell Pipe Line's McCamey-Houston crude-oil line into the Deer Park refinery. Since it started operation in July 1947, the line has run without mechanical trouble and with a minimum of product contamination or loss.



Left: Deer Park terminal with hay tank filter at left and meter provers at right. Below: Close-up view of meter provers



New Control Method Assures Shut-in if Flow Line Breaks

by D. H. Stormont

A SURFACE safety valve designed to close against tubing pressures of 1,800 to 1,900 psi. recently was incorporated in a well-head hookup at an oil well in Lindsay pool of Garvin County, Oklahoma. The well, Phillips Petroleum Co. 1 Lindsay, is located in the bed of the Washita River and is connected to a separator through 200 yd. of flow line. Since the well and flow line are vulnerable to flash floods and high water, the safety valve was necessary to assure an automatic shutoff in event of a flow-line break.

The christmas tree in which the safety valve is incorporated is a 10,000-psi. test unit with a single flow wing. The safety-valve operating mechanism was incorporated into the hookup by substituting it for the bonnet, stem, and wheel of the upper gate valve. As shown in the accompanying photograph, the valve is installed immediately above the tubing gate valve.

Flowing tubing pressure of the well is between 1,800 and 1,900 psi. Pressure on the downstream side of the choke from which operating gas for the valve is obtained is slightly in excess of 60 psi. (separator pressure of 60 psi. plus the pressure drop in the 200-yd. flow line). The safety valve is set to remain open with the separator pressure maintained at 60 psi., and to close automatically when the separator pressure drops to between 45 and 50 psi.

The large cylinder shown extending to the right in the photograph contains a 6-in. piston fastened to a stem, one end of which may be seen protruding from the cylinder and the other end fastened to the wedge gates in the gate valve. The smaller vertical cylinder shown below the large cylinder is the pilot-valve mechanism which contains a spring-loaded ball and seat. Compression in the spring which pushes the ball off the seat is set by the adjusting screw protruding from the lower end of the pilot valve; the setting is maintained through subsequent operations by means of the lock nut on the lower end of the adjusting-screw stem. The pilot is connected to the operating cylinder at a point below the piston.

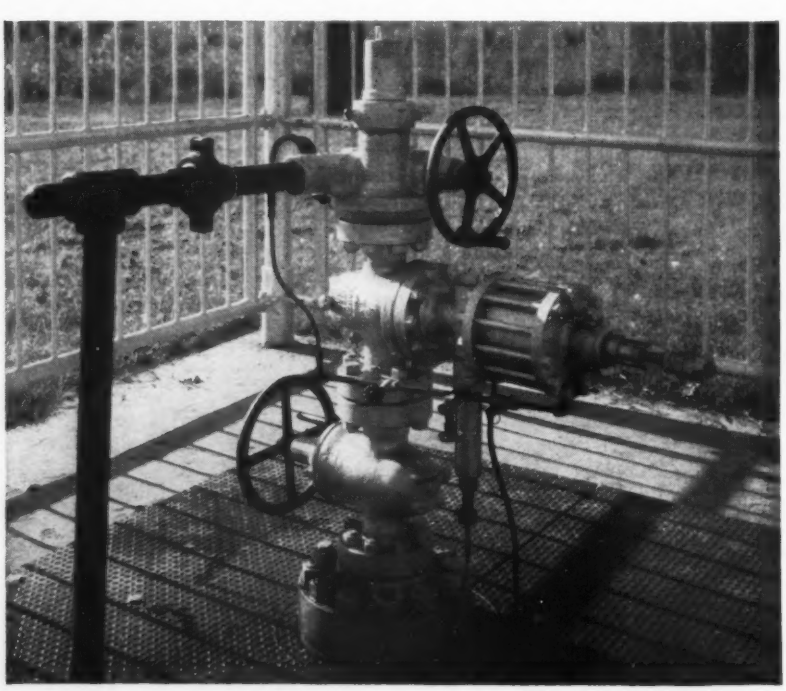
Operating gas is taken from the flow line below the choke and enters the cylinder on the upper side toward the exposed stem end. The stem is drilled to allow gas to equalize on both sides of the piston. When the valve is in an open position, pressure entering the upper cylinder from the flow line passes through the hollow stem into the lower cylinder. During normal operation with the separator pressure being maintained, no pressure differential exists across the large piston. Thus the valve remains in an open set position as the force exerted by the pilot spring is not sufficient to force the ball from its seat.

When the flow-line pressure drops, as would be the case when the line breaks, forces opposing the spring decrease proportionately and the ball is unseated with a snap action. This allows pressure from the lower side of the piston to escape through the pilot to atmosphere at a more rapid rate than it can enter through the valve-stem orifice. This causes a pressure differential across the piston which acts on the net area of the piston and causes it to move forward.

As the valve stem moves forward, the small horizontal port which admits pressure to the pilot-connected side of the piston enters the lower stem packing section. This action prevents admission of pressure to the lower chamber, and line pressure which remains above the piston holds the valve in a closed position. Once the valve reaches a closed position, the upper stem is engaged by a locking device which holds the valve closed regardless of pressure conditions in the cylinder or valve body —it must be manually reopened.

Opening and resetting of the valve requires only a few minutes. An opening spacer is placed around the upper portion of the piston stem and between the cylinder and the valve handle. By turning the opening handle, the stem, piston, and gate may be moved upward until the port in the lower stem emerges from the lower packing section. Gas or fluid will then escape through the pilot. Then by retracting the pilot adjusting screw until the ball is reseated (as indicated by absence of flow from the pilot) sufficient pressure may be built up below the piston to cause the valve to open itself. When pressure has reached normal levels, the pilot adjusting screw is set to its former position as indicated by the lock nut.

This safety-valve installation at Phillips 1 Lindsay was designed by Otis Pressure Control, Inc., of Dallas, to meet the particular requirements of this well. The metal guard shown surrounding the well-head connections was installed for the purpose of warding off driftwood during high water, eliminating the possibility of its causing damage to the well-head fittings.



Well-head hookup with automatic safety valve for closing tubing. Valve operates by differential pressure through spring-loaded pilot valve shown on under side

FLOW beans are used extensively in the control and measurement of high-pressure natural-gas flow. Until very recently the industry has endeavored to manufacture a flow bean as specified by the U. S. Bureau of Mines using the flow coefficients as set forth by them entirely.

In the calibration of this type of bean it has been found that even though the manufacturer endeavors to make one that meets these specifications, in many instances the nipples do not have the standard flow coefficients. Also, after these nipples have been used, it is found that wear has profound effect upon their delivery capacity.

In addition, test work has shown that a number of factors other than the size of the hole have considerable effect upon the capacity of the beans. Among these factors are: finish, ratio of length to diameter, straightness of the hole, and the chamber at the hole entrance.

It is the belief of some that a forward step has been made by the use of flow beans of a different design from the Bureau of Mines' type. Calibration work on some of these new flow beans has shown more accurate curves for the prediction of open flow than those of the older type because of their uniformity. It is the belief of some that the industry should standardize the manufacture of flow beans.

The accompanying article describes a method of determining flow coefficients for positive flow beans. It is intended to be an initial step toward setting up flow bean standards for the industry. The study was conducted by Texas A. & I. College at the request of the Railroad Commission of Texas.

Determination of

Flow Coefficients for Positive Flow Beans

by J. E. Loeffler* with Frank H. Dotterweich†

THE capacity of a natural-gas well to produce gas can be described in terms of the "open-flow" delivery and the "shut in" pressure at the well head. One reliable method of determining open-flow capacity is set forth in "Back-Pressure Data on Natural Gas Wells and Their Application to Production Practices" found in Monograph 7, U. S. Bureau of Mines, Department of the Interior. The simple procedure described obviates many of the disadvantages incident to open-flow tests like excessive waste of gas, inaccuracy of measurement under open-flow conditions, and damage to equipment and production horizons.

In the Bureau of Mines method of determining open-flow and gas-well delivery rates used in the computation of open flow are obtained under varying back-pressure conditions by means of critical flow. Various methods of gas measurement like the orifice meter, critical-flow provers, pitot tube, chokes, etc., were investigated in this study of the Bureau of Mines. It was concluded that choke nipples could be most advantageously used to measure rates of delivery of gas during back-pressure tests where the flow of gas has been vented to the atmosphere and it is impracticable to use the orifices on the critical-flow prover because of excessive gas pressure or damaging effect of abrasive materials carried in the gas stream.

In the B. of M. Monograph 7, the type of choke used together with coefficient are the same as set forth in Fig. 1 and Table 1, respectively. The chokes together with coefficients as set forth in Fig. 1 and Table 1 are frequently referred to as the Bureau of Mines chokes and coefficients. It has been reported[1] that this choke design and its coefficients were based upon 300 field tests by P. M. Biddison prior to 1927. Thus it may be seen that the chokes and data now being used for the official determination of prorated wells in the majority of cases were determined and published prior to 1928.

It appears that difficulty has been encountered in producing a choke as indicated in Fig. 1 because chokes of this type with 2⅜-in. outside diameter with 6-in. bore, when submitted for calibration to the engineering division of Texas A. & I. College, had coefficients which varied from the so-called Bureau of Mines coefficients. This variation in coefficients was apparently due to the bore finish, design, and workmanship of the products.

An extended study on the calibration of positive-flow beans, which was requested by the Railroad Commission of Texas, was that as conducted at Texas A. & I. College on beans of ⅛ through ¾-in. bore as manufactured by Thornhill-Craver Co., Inc. Fig. 2 illustrates one of these positive choke assemblies, with flow bean. The interchangeable flow beans, 6 in. in length, are accurately machined and are of steel which is carburized and heat treated for extreme hardness. Following is a condensed discussion of the determination of flow coefficients for these positive flow beans. For an extensive discussion of these calibrations, together with the derivation of formulas used therein, and a discussion of critical flow, reference is made elsewhere.[2]

TABLE 1—COEFFICIENTS* FOR CHOKE NIPPLES WHEN MEASURING DELIVERY RATES UNDER CONDITIONS OF CRITICAL FLOW

Size of choke (in.)	Coefficients†
⅛	6.25
7/64	14.44
¼	26.51
9/32	43.64
⅜	61.21
11/32	85.13
½	112.72
⅝	179.74
¾	260.99

*Based on data from Diehl, John C., Natural Gas Handbook, p. 294.

†Coefficient C in formula:

$$Q = \frac{CP}{\sqrt{GT}}$$

where

Q = rate of flow, M.c.f. per 24 hours at pressure base of 14.4 psi. and temperature base of 60° F.
C = coefficient
P = upstream pressure, psia.
G = specific gravity of gas (air = 1.00)
T = temperature of flowing gas, °F. abs.

Methods of Conducting Tests

In this study the flow beans submitted were tested in the laboratory by means of a large-capacity positive-displacement meter connected in series, which displacement meter was proved before and after the tests with a critical flow prover using air as the medium.

Following the laboratory tests the flow beans were tested in series with a flow meter whose orifice plates

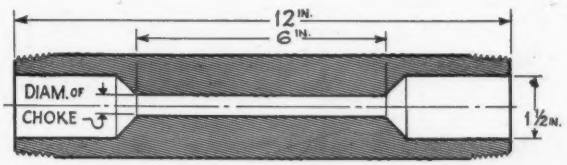


Fig. 1—One design of choke nipple for regulation and measurement of deliveries of gas from gas wells

*Chief engineer, Thornhill-Craver Co., Houston. †Director, division of engineering, Texas A. & I. College, Kingsville.

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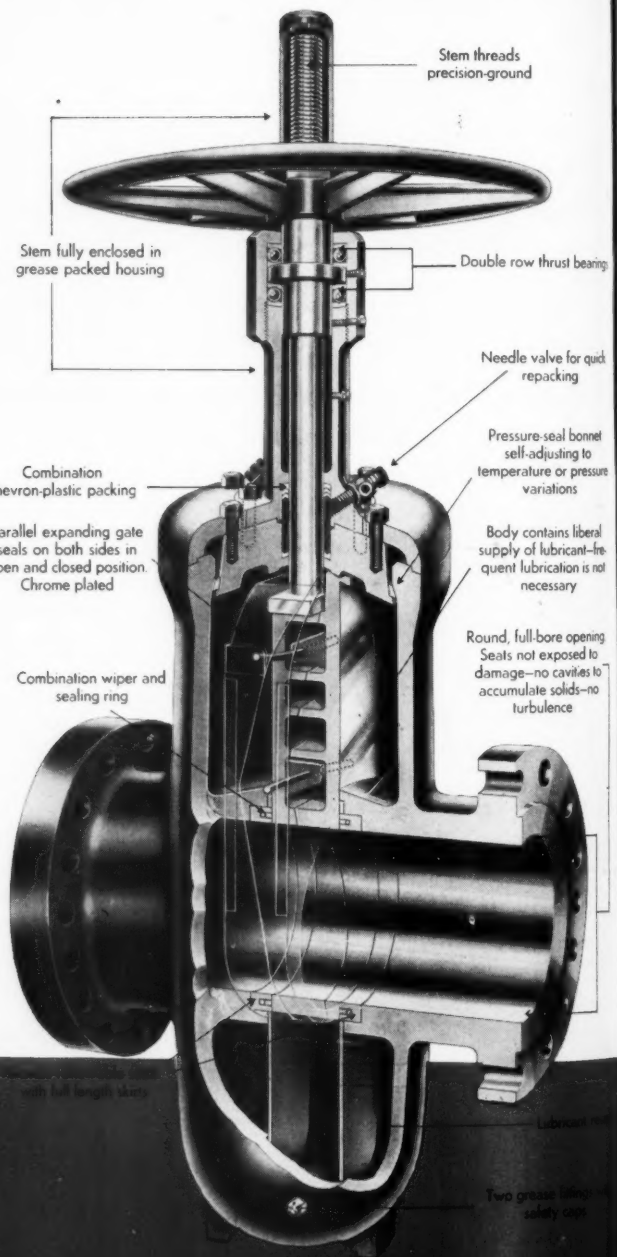
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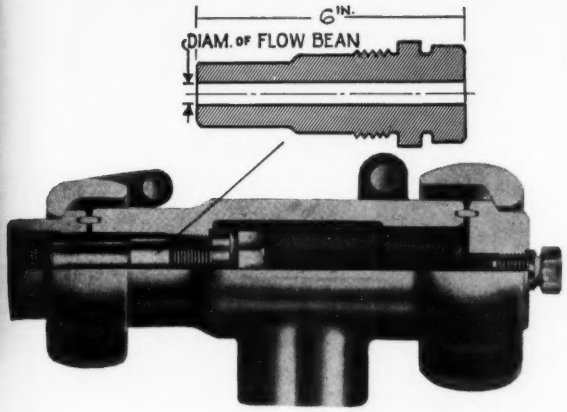

Fig. 2—Section through Unibolt choke body assembly showing positive flow bean

were calibrated. In these tests, high-pressure natural gas was used. During the laboratory and field tests a gravimetric method was developed and used to determine the average internal diameter of each flow bean.

Laboratory Gravimetric Tests

So that an accurate average internal diameter of the flow beans could be obtained, the following method was developed and used. This method and procedure was carried out in the following sequence:

1. The flow-bean bore was thoroughly cleaned by use of solvents and conventional pipe cleaners.

2. A special clamp was devised which held the flow bean in a vertical position and which also allowed for a seal so that when mercury was run into the bore, the bean could be accurately filled.

3. Mercury was run into the bore and the bean tapped to remove included air. The mercury meniscus was removed so that the level of the mercury formed a continuous plane with the top of the bean. This was accomplished by the use of a small section of plate glass placed flat on top of the filled bean and the excess mercury squeezed out from the top of the bean.

4. The mercury was then removed to a small beaker and its weight accurately determined. From this weight and the measured length of the bean the average internal diameter was calculated. In these calculations provision was made for the thermal expansion of mercury.

Field Flow Tests

The 3-in. horizontal test-meter run was removed from the laboratory and set up on the east tubing flow wing of Chicago Corp. 2 Process Ingram well, producing from a depth of 4,936 ft. The flow beans to be tested were placed in series with the flow meter and the tests conducted at various pressures. During the 5-day period of testing, the well flowed at a continuous rate of about 16 million cubic feet of gas per day so that uniform conditions of temperature and chemical composition could be assured throughout the test. The gas produced was delivered to a transmission system. The small quantity of gas used for testing was vented to the atmosphere only after permission was granted by the Railroad Commission of Texas. The 2 Process Ingram well was selected because of its low natural-gasoline content of about 0.04 gal. per thousand cubic feet. By calculation from the chemical analysis of the gas, the specific gravity was found to be 0.602.

Method of Computation

1. Calculation of flow coefficients from laboratory data:

The flow beans were calibrated by being run in series with a large-volume positive-displacement meter which was proven by standard procedure with a critical-flow prover. Under these conditions it was only necessary to note the upstream temperature (T) of the air, the meter index (Q_1) over a period of time in seconds (t) which gave the meter rate. In all cases the time lapse of the test was greater than 120 seconds. Throughout the laboratory tests and proof of meter (MP), 20 psig. pressure was maintained on the meter.

Under these conditions the respective coefficients were calculated as follows:

$$C = \frac{3{,}066.4\ Q_1\ MP}{t\sqrt{T}}$$

2. Calculation of discharge coefficient of flow beans from laboratory data:

The discharge coefficient (C_d) of the flow beans was calculated from the respective flow coefficient (C) and average internal diameter (d). This relationship is:

$$C_d = \frac{C}{475.46\ d^2}$$

3. Calculation of orifice-plate coefficients from laboratory data:

The coefficients for ⅜ to 1½-in. size plates for a 3-in. i.d. flange-connected meter run were calculated from the formula:

$$C_o = \frac{5{,}603.5\ Q_1\ MP\ P_M}{t\sqrt{h\ P_o\ T}}$$

These calculations from the above formula were made possible from data secured by placing the orifice-meter run in series with a proved positive-displacement meter. The coefficients experimentally determined in this manner were in agreement with those as reported in Appendix to Gas Measurement Committee Report No. 2, Natural Gas Department, American Gas Association, May 6, 1935.

4. Calculation of flow-bean coefficients from field data:

With the flow beans and orifice meter run connected in series as previously described in the field location, data were taken on flow beans from ⅛ to ¾ in. in diameter. The bean-flow coefficient (C) was then calculated by using the following formula:

$$C = \frac{0.5473\ C_o\ \sqrt{h\ P_o}}{P_1}$$

Summary of Laboratory and Field Tests

A correlation of laboratory and field results of critical flow characteristics is set forth in Table 2. It will be noted that fair agreement exists under these conditions for the ⅛, 5/16, ¼, ⅜, 7/16, and ½-in. sizes with very satisfactory correlations for the larger sizes. The appreciable variations as noted for the ¼ and 5/16-in. flow beans may have resulted from any or all of the conditions encountered in the field tests as follows:

1. The differential chart graduation on the flow meter was in 2-in. intervals making it necessary to estimate readings for less than 2-in. increments.

2. The static-pressure gage attached to the flow meter was graduated in 5-lb. increments making estimations difficult for intervals of less than 5 lb.

3. Changes in fluid characteristics while testing would introduce errors. However, it is believed a satisfactory dry gas was used during the field tests, excepting during a portion of

TABLE 2—SUMMARY OF LABORATORY AND FIELD TESTS

Size of bean, in.		Flow coefficients, C			Discharge coefficient, C_d		
Nominal	Actual avg.	Laboratory	Field	% Deviation	Laboratory	Field	% Deviation
⅛	0.1250	5.648	5.469	—3.2	0.7602	0.7361	—3.2
5/16	0.1870	13.392	12.598	—5.9	0.8049	0.7563	—6.0
¼	0.2494	24.572	22.346	—9.0	0.8324	0.7553	—9.2
5/16	0.3119	38.484	37.230	—3.2	0.8322	0.8048	—3.2
⅜	0.3757	55.854	55.481	—0.7	0.8324	0.8286	—0.5
7/16	0.4382	75.558	75.194	—0.5	0.8275	0.8236	—0.5
½	0.4992	98.072	100.660	2.6	0.8278	0.8499	2.7
5/8	.....	.....	152.257	...	.....	0.8198	...
¾	.....	.....	224.617	...	.....	0.8399	...

A New Year's message
to our friends
As a difficult year draws to a close we take this opportunity to express appreciation to our many customers for their business and for their patient understanding.
The unusual demand for steel created an almost insurmountable problem for the industry.
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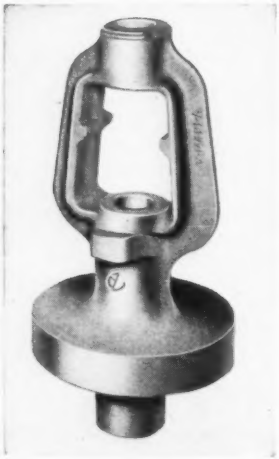

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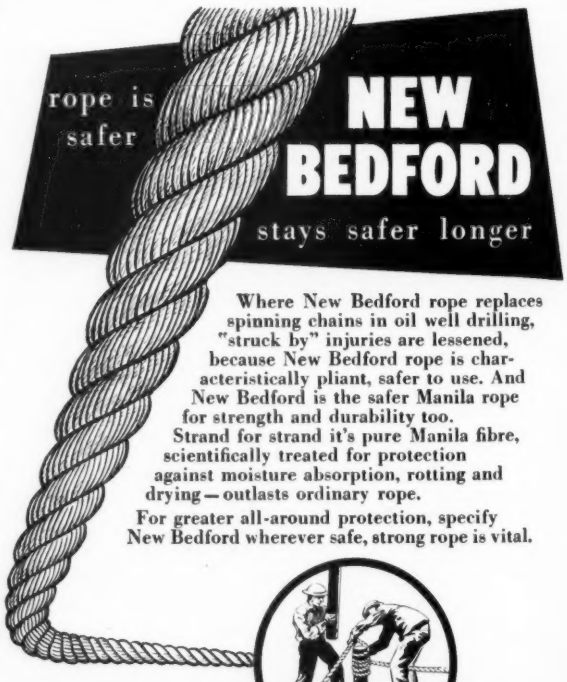

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a few of the tests in which case the coefficients were not calculated.

As may be expected the variations of the discharge coefficients followed those of the flow coefficients very closely.

Fig. 3 graphically presents the flow coefficients of the flow beans tested, of all sizes. In plotting sizes of ½ in. and below, laboratory results were used; for the larger sizes, field results were used. It will be noted for the flow beans of from ⅛ through ¾ in. (6 in. in length), a straight line results when plotted on log paper. This relationship indicates that the laboratory results for the smaller sizes are consistent. Since the correlation of field and laboratory results were favorable, the use of field results for the ⅝ and ¾-in. beans is believed to be in order. This assumption is confirmed when the line is extended and these sizes are included on the curve developed with the smaller sizes.

This graph shows that the flow coefficient is proportional to the product of a constant and the diameter raised to approximately the second power, or:

$$C = 401.54\ d^{2.0280}$$

where C is the flow coefficient and d is the average internal diameter.

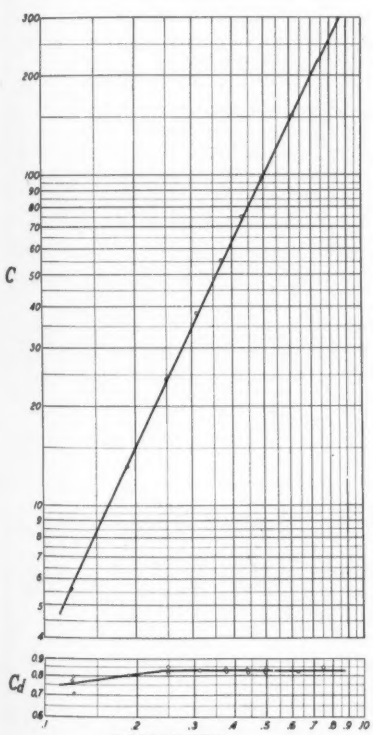


Fig. 3—(Top) Flow coefficient, (C) vs. diameter in inches in formula

$$Q = \frac{C\,P}{\sqrt{G\,T}}$$

Fig. 4—(Bottom) Coefficient of discharge (C_d) vs. diameter in inches, ⅛ through ¾ in.

TABLE 3—CARTHAGE FIELD, CALIBRATION OF POSITIVE CHOKES ON A. L. G.-L. H. PIRKLE 1-C UPPER PETTIT

Barometer reading, 14.7 psia. Gravity (estimated), 0.6

Choke size (in.)	Micrometer reading—Inlet	Micrometer reading—Outlet	Choke upstream pressure, psig.	Flowing temp. (°F.)	Flow meter volume, M.c.f./day	Choke* vol., M.c.f./day	% Diff. in vol.
⅜			277.5	75	881.5	905.24	2.7
⅜	0.375	0.375	410.5	80	1,276.5	1,310.6	2.6
⅜			504	83	1,591.0	1,594.3	0.2
½			167	79	940.3	1,004.2	6.8
½	0.500	0.500	226	62	1,361.6	1,351.3	—0.8
½			535	64	2,936.1	3,080.9	4.9

*Volume of flow through choke calculated using the following experimentally determined flow coefficients for standard Thornhill-Craver flow beans: Size (in.) C: ⅜—55.85; ½—98.07.

Fig. 4 graphically portrays the discharge coefficients plotted versus diameter. It will be noted that the discharge coefficients become constant at about 0.830 for ¼ through ¾-in flow beans. From the results obtained in the study the flow coefficients of the standard 6-in.-long Thornhill-Craver positive-flow beans appear to be as follows:

Nominal diameter (in.)	Average flow coefficient, C	Avg. discharge coefficient, C_d
⅛	5.65	0.7602
3/16	13.39	0.8049
¼	24.57	0.8324
5/16	38.48	0.8322
⅜	55.85	0.8324
7/16	75.56	0.8275
½	98.07	0.8278
⅝	152.26	0.8198
¾	224.62	0.8399

These coefficients are used in the following formulas:

$$Q = \frac{C\,P_1}{\sqrt{G\,T}}$$

$$Q = \frac{605.37\,C_d\,A\,P_1}{\sqrt{G\,T}}$$

where

Q = volume of flow, M.c.f. per 24 hours at 14.65 psi. and 60° F.
C = flow coefficient
C_d = coefficient of discharge
P_1 = upstream pressure, psia.
A = area of flow bean bore, sq. in.
G = specific gravity of gas (air = 1.00)
T = flowing temperature, °F. abs.

Natural-Gas Measurement

In a preliminary investigation by W. L. Stanton, chief engineer of Carthage Field Engineering Committee, under field flow conditions in which the positive-flow beans described here were checked against a flow meter in Carthage field, Panola County, Texas, various data were recorded. A portion of these data is reproduced in Table 3. It will be noted that when the flow coefficients as determined herein are used to calculate the gas flow and this flow correlated with that as determined by flow-meter methods, a very satisfactory comparison is obtained when it is recognized that in these field operations fluid was encountered.

Conclusions

1. From the limited number of tests performed on the positive-flow beans described here, it appears that their accuracy in measurement approaches that of the conventional flow meter.

2. Unless positive-flow beans are manufactured under close control with specified tolerances as to bore diameter, finish of bore, shape of entrance of bore, straightness of bore, and length of bore, wherein established coefficients for their particular design may be used (coefficients made of samples), each bean should be individually calibrated.

3. Developments to date suggest that additional research on the effects of the above mentioned variables on flow coefficients will be of profound benefit in establishing control limits.

References

1. Natural Gas Engineers Handbook, by J. C. Diehl, p. 295.

2. Report on the Calibration of Positive Flow Beans as Manufactured by Thornhill-Craver Co., Houston, by Harold L. Cook, Jr., with Frank H. Dotterweich.

Gasoline-Tax Revenue This Year Exceeds $400,000,000

WASHINGTON.—Gasoline-tax collections for the year topped the $400,000,000 mark in October, with 2 months yet to go, it was announced this week by the Internal Revenue Bureau. Compared with the same period last year, this represented an increase of more than $30,000,000.

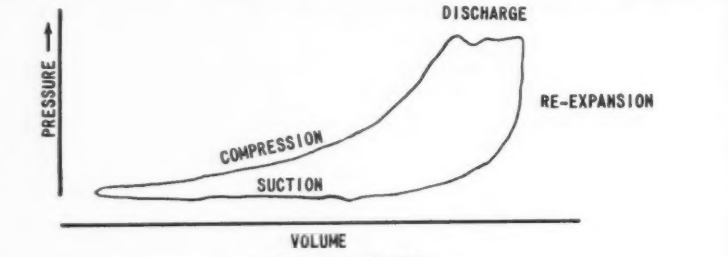
The bureau's monthly report showed that the Treasury collected $45,803,408 from gasoline in October against $35,496,620 in the same month in 1947. Lubricating oils returned $6,289,819 against $6,281,697, and pipe-line transportation $2,004,080 against $2,307,272.

For the 10-month period, the records show, the gasoline tax returned $401,978,791 against $369,314,711 last year; lubricating oils $68,679,045 against $65,028,495, and pipe-line transportation $15,987,714 against $15,206,776.

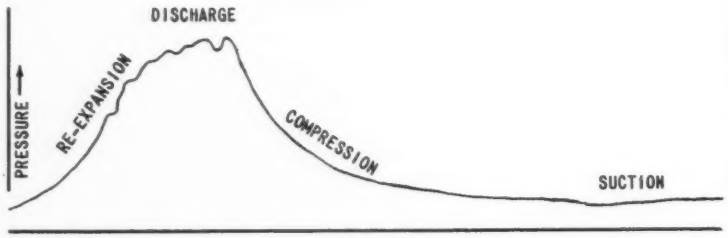
Trouble Shooting—

With Open-Type Indicator

by J. L. Bryan, Jr.



1-A CLOSED TYPE CARD



1-B OPEN TYPE CARD

Fig. 1—Open-type and closed-type indicator cards

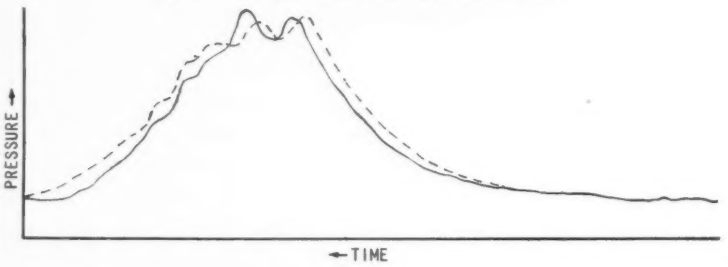


Fig. 2—Effect of leaking suction valves on shape of open card

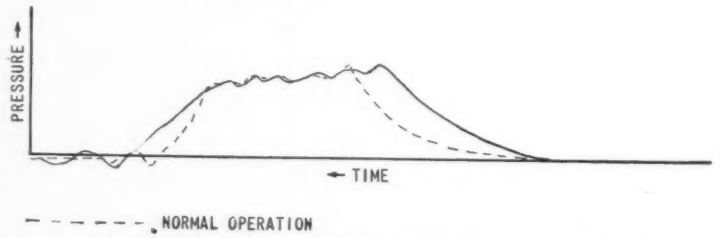


Fig. 3—Effect of leaking discharge valve on shape of open card

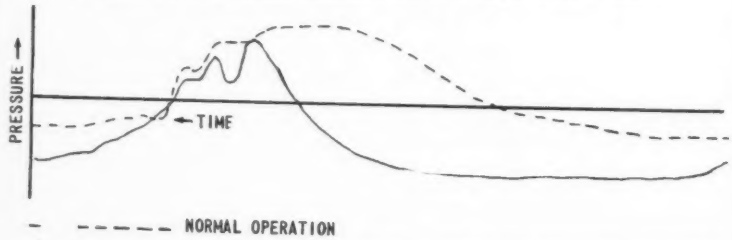


Fig. 4—Illustration of reduction of compressor capacity by improperly assembled suction valves

FOR many years indicator cards have been widely used for compressor trouble shooting. Leaking suction and discharge valves, piston-ring leakage, improper operation of suction-valve unloaders, and other difficulties may be studied and identified by indicator cards. Two types of indicator cards are used.

The closed card, illustrated by Fig. 1-A, is obtained by synchronizing the travel of a spring-loaded metal stylus with travel of the compressor piston to obtain a closed figure. A calibrated spring is opposed to cylinder pressure in such a manner that the metal stylus is displaced vertically as a function of cylinder pressure.

The open card, illustrated by Fig. 1-B, is obtained by replacing the small drum used for closed cards with a larger drum, usually about 6 in. in diameter, provided with a spring for imparting rotating motion to the drum and with a tachometer for obtaining drum speed. Cards are obtained by adjusting speed of the drum to the desired value and pressing the metal stylus to a strip of sensitized paper placed over the drum. A continuous record is traced of pressure versus time.

The use of the conventional closed-type compressor indicator card for routine trouble shooting is not practicable with modern angle-type compressors. The high speed (300-350 r.p.m.) at which these machines usually operate makes closed cards of questionable value in the determination of compressor brake horsepower. Synchronizing mechanisms for obtaining closed indicator cards are not usually included as a part of the machine, but they may be obtained, if desired, as special equipment. No auxiliary attachments are required for obtaining open cards. It is not readily possible to obtain compressor brake horsepower from the open card owing to the difficulty of locating the point of piston top-dead-center.

It will be noted from Fig. 1-B that no definite point of compressor top-dead-center can be located at the end of the open card discharge stroke. Examination of two successive cycles will disclose an appreciable change in length as the drum slows down. The normal slowing-down rate of the

Compressor Cards

and J. W. Wall

drum is increased by the drag of the metal stylus. For these reasons, no effort is made in this article to discuss the procedure used to replot an open card, with pressure-time coordinates, to a closed card having pressure-volume coordinates.

Trouble-Shooting Procedures

A number of common compressor troubles may be accurately diagnosed by use of the open cards. A procedure is presented for routine trouble shooting employing reference cards taken under conditions of known satisfactory compressor operation. These cards are traced and retained for future reference. It is advisable to check suction and discharge pressures of the reference cards, employing the small boxwood scales usually supplied with each spring.

If suction and discharge pressures read from the indicator cards correspond closely with the suction and discharge pressures read from the compressor gages, the calibration of the spring may be safely accepted as satisfactory. If a discrepancy is found, it will be necessary to determine by means of calibrated test gages whether the indicator or compressor gage is at fault. When compressor trouble is encountered, a set of cards should be taken and compared with reference cards. It will often be necessary to replot cards to obtain the same length as the reference cards. Comparison is best done by dividing cards into 20 equal parts and replotting both to the same length. Interpretation of these cards is discussed below. In all cases a card exhibiting some phase of compressor trouble is compared with a reference card taken during a period of good operation.

Fig. 2 presents a typical case of leaking compressor suction valves. Examination shows that with leaking suction valves the discharge line drops at a more rapid rate than with valves operating correctly. Gas is discharged through the leaking suction valves during reexpansion, causing pressure to drop at a faster rate than usual. The suction line is normal until the point of valve closure, after which the pressure does not rise as rapidly as that of the reference curve. The discharge line is appreciably shorter

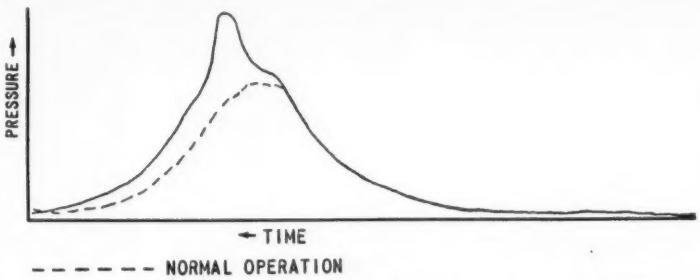


Fig. 5—High peak pressure at end of discharge stroke caused by improperly beveled piston

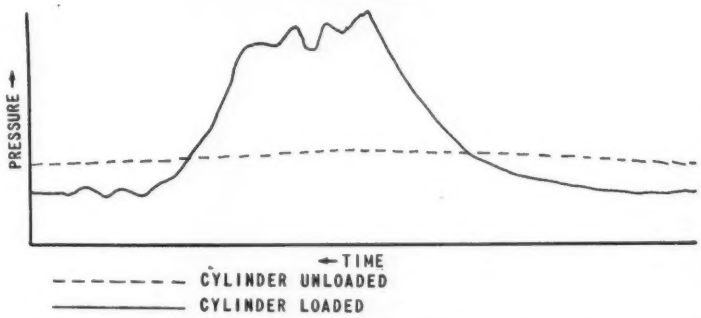


Fig. 6—Curves obtained from completely unloaded cylinder and from normally loaded cylinder

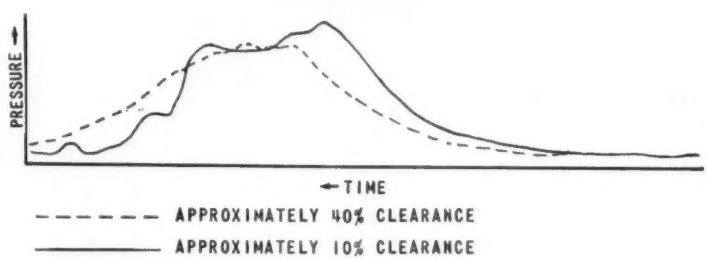


Fig. 7—Effect of cylinder clearance on indicator card characteristics

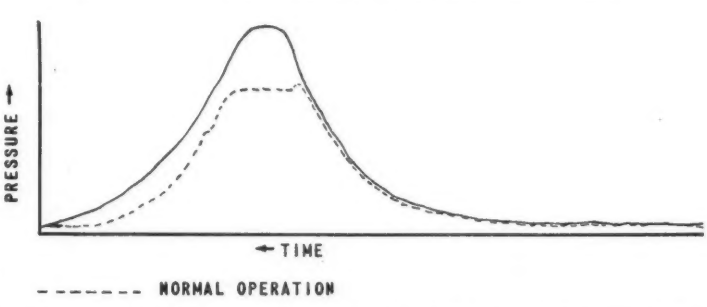


Fig. 8—High discharge pressure caused by partially plugged discharge header

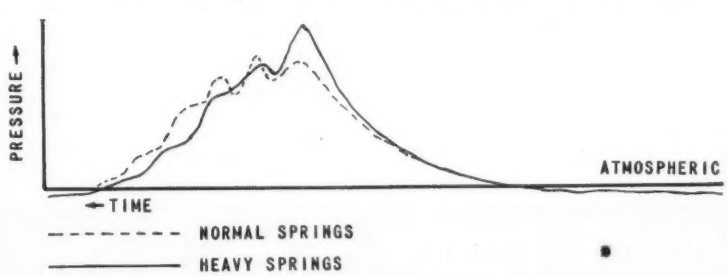


Fig. 9—Example of high initial pressure required to lift heavy discharge valve springs

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The photo shows 18-inch flanged cast iron pipe being installed to serve as jackets to protect insulation on an 8-inch high-pressure steam line at a refinery. Service rendered to the petroleum industry by cast iron pipe may not always be as spectacular but it is always reliable and economical. No other pipe, at reasonable cost, offers comparable resistance to interior and exterior corrosion. Figured per service-year the direct economy of cast iron pipe is substantial. Available with bell-and-spigot, plain end and flanged, or with standardized mechanical joints. Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago 3, Illinois.

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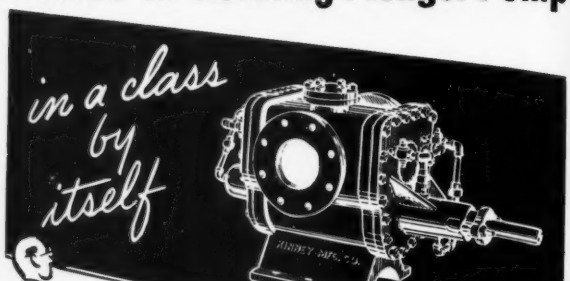
KINNEY SD Rotating Plunger Pump



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than that of the reference curve. These conditions will also be encountered from leakage of compressor piston rings; however, in the event of leaking piston rings, the discrepancies discussed above will be found on both frame and outboard cylinder ends. Usually a leaking suction valve will be appreciably warmer to the touch than normal valves.

Fig. 3 presents a typical example of broken discharge valves. The suction line is shorter than that of the reference because extra gas leaking in through the discharge valves raises the suction pressure faster than normal. A long reexpansion line is produced by gas leaking from the discharge header. It will often be found that this trouble results in hot suction valves. The presence of a single hot suction valve usually indicates suction-valve failure; however, if all suction valves are found to be hot, the cause will usually be found to be broken discharge valves.

Valves may at times be placed in service incorrectly assembled. In the example selected for Fig. 4, suction valves failed to open during the suction stroke and failed to remain closed during the discharge stroke. It will be noted from Fig. 4 that the magnitude of the discharge portion of the card is considerably reduced and that a higher-than-normal vacuum is drawn during the suction stroke. This condition may not be readily detected in vacuum pumps operating under high compression ratios.

Fig. 5 presents a condition found during an investigation to determine the reason for excessive piston-rod failures in a group of compressors. The only divergence between the test card and the reference card is a peak pressure encountered near the end of the compressor discharge stroke. This pressure was found to be approximately 35 lb. higher than the pressure existing in the discharge header. Cards taken on the opposite end of the compressor cylinder did not exhibit these high pressures. Examination revealed that the compressor piston sealed off the discharge valves near the end of the stroke. The bevel at the end of the compressor cylinder was enlarged and subsequent cards revealed normal pressures in the cylinder. Piston-rod breakage is now almost eliminated.

Fig. 6 illustrates cards obtained before and after suction-valve unloaders were placed in operation. Many compressor installations today utilize air-operated unloaders to unload compressor cylinders to meet changing process requirements. These unloaders usually consist of an air-operated plunger and a set of "fingers" inside the machine which hold the suction-valve strips away from the valve seats until the plunger is depressed.

It will be found on occasion that poor alignment of interior working parts will result in improper operation of the unloader fingers and consequent complete or partial failure to unload the cylinder. This condition is difficult to detect from routine inspections of the machine if the plunger operates in a normal manner. Fig. 6 illustrates that satisfactory unloader action will result in a card showing essentially constant pressure during the entire compressor cycle. Partial disengagements of fingers will result in "humps" on the card, which will vary from values slightly above suction pressure to a normal loaded card under conditions of complete failure of the unloader mechanism.

Fig. 7 illustrates the effect of compressor-cylinder clearance on indicator cards. If clearance pockets are provided, additional cards should be taken with the pockets in operation (providing additional clearance) when reference cards are obtained. These cards will prove valuable in checking operation of the pockets at a later date if trouble is suspected.

Fig. 8 illustrates the effect of an obstruction in compressor discharge lines. Compressors operating with heavily fouling conditions, such as feed gas containing appreciable amounts of hydrogen sulfide and air, will be found to deposit a layer of sediment in discharge headers. This condition may be followed by periodic comparisons of compressor indicator cards with reference cards. The presence of a uniformly high discharge line is representative of this condition. It may be used to schedule routine equipment cleaning. The use of a pressure gage to determine fouling conditions is also possible; however, pressure gages on the discharge lines of reciprocating machines are often subject to considerable error.

Fig. 9 illustrates the effect upon the compressor discharge line of excessively heavy springs in the discharge valves. It should be noted that higher-than-normal initial pressures are required to open the discharge valves, and the normal irregularity or valve flutter in the discharge line is not apparent. It may also be found that the entire discharge line will be appreciably higher than normal.

Considerable loss of capacity will result from broken or leaking piston rings. It is desirable to obtain cards on both frame and outboard ends of the compressor cylinder to distinguish this trouble from leaking suction valves. Both leaking suction valves and leaking cylinder rings are characterized by long compression lines and by steep reexpansion lines.

The procedures discussed above are not intended to supersede routine trouble-shooting procedures familiar to all compressor operators, such as detection of leaking suction valves by temperature rise and detection of a leaking discharge valve by heating of all compressor valves. Some operators use increase in discharge temperature as an indication of valve trouble.

The use of indicator cards does furnish a method of checking doubtful cases and will at times prevent removing a machine from service to check suspected troubles. Many of the examples discussed above may be solved more easily by means of the indicator cards than by other means. For example, the indicator card is the best method of checking unloader irregularities. The continued use of these cards will doubtless suggest other uses to the user.

THE AUTHORS

J. L. BRYAN, JR.

J. W. WALL

John L. Bryan, Jr., joined Esso Standard in 1946. He obtained a B.S. degree in chemical engineering at Mississippi State College in 1938, and an M.S. in chemical engineering at University of Wisconsin in 1939. He taught chemical engineering at Mississippi State College, 1939-42. He served 3 years during World War II with the Navy. He is presently a member of the petroleum technical service department.

John W. Wall joined the petroleum technical service department, Baton Rouge refinery, Esso Standard Oil Co. in 1938. While on military leave from 1942 to 1946, he attended diesel schools at the General Motors factory, Cleveland, and at General Motors Institute, Flint, Mich., and subsequently served as engineering officer aboard an L.S.T. in the Pacific. He returned to Esso Standard in 1946 and has since specialized on compressor operating problems.

Social Security for Oil Contract Workers Sought

WASHINGTON.—Repeal of legislation enacted by the last Congress to keep filling-station operators and certain other groups classified as independent contractors from being brought under the coverage of the Social Security Act will be sought early next year by Rep. John D. Dingell of Michigan.

The legislation was enacted following a Supreme Court decision in 1947 which held that the original Social Security Act passed in 1935 covered filling-station operators, commission and certain other types of salesmen, truck drivers, and piece workers.

The Problem of

GAS-WELL SPACING

*by D. T. MacRoberts**

The Physical Problem

THE spacing problem in natural-gas wells, from the physical aspect of ultimate recovery, can hardly be said to exist. Some years ago the author proposed a solution to this problem which showed that the ultimate recovery from gas reservoirs was practically independent of the spacing—for any reasonable well density—but although the problem was explicitly stated as one in physical recovery, the solution was essentially an economic one, based upon abandonment pressures.

Upon further reflection it is obvious that there is no problem of ultimate recovery in gas reservoirs as a function of spacing. Given sufficient time a single well will drain any connected reservoir—there is nothing to prevent it. No dissipation of energy occurs as a gas flows through a porous reservoir body. The potential energy (pressure) is converted into kinetic (motion) but the reconversion to potential is complete as soon as flow stops. Any dissipation of energy into heat (friction) is transferred to the formation which again gives it up to the gas.

The basic difference between the energy relations of oil and gas reservoirs is that in gas reservoirs the energy of the fluid accumulation is simply "P × V"—the reservoir pressure times the volume of gas. This cannot be dissipated except by actual production of the gas. In oil reservoirs, on the other hand, the energy for expulsion of the oil is, in large part, exterior to the oil accumulation itself and may be dissipated without attendant production of oil.

Since there is no ultimate recovery problem in gas-driven gas reservoirs there is none in water-driven gas reservoirs. Too high production rates may fail to utilize fully the energy available in the water but cannot decrease the ultimate physical recovery. As the edge water encroaches and inliers form, the reservoir itself breaks up into separate reservoirs each of which must have a well for complete exhaustion and in this limited sense these can be said to be a spacing problem. Such

*Union Producing Co., Shreveport, La. Paper presented before Special Study Committee on Allocation of Production and Well Spacing, twenty-eighth annual A.P.I. meeting, Chicago, November 9.

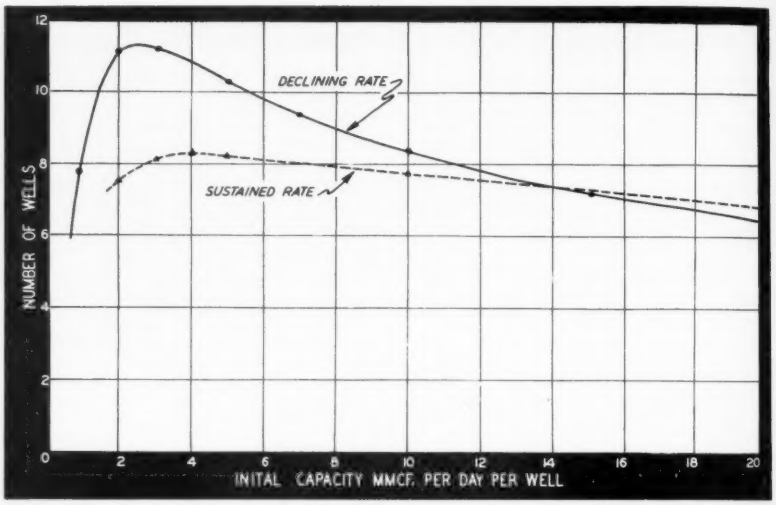


Fig. 3

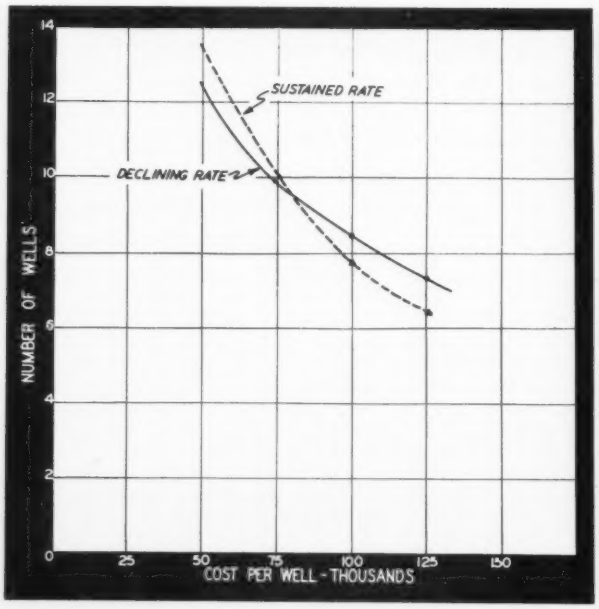


Fig. 1

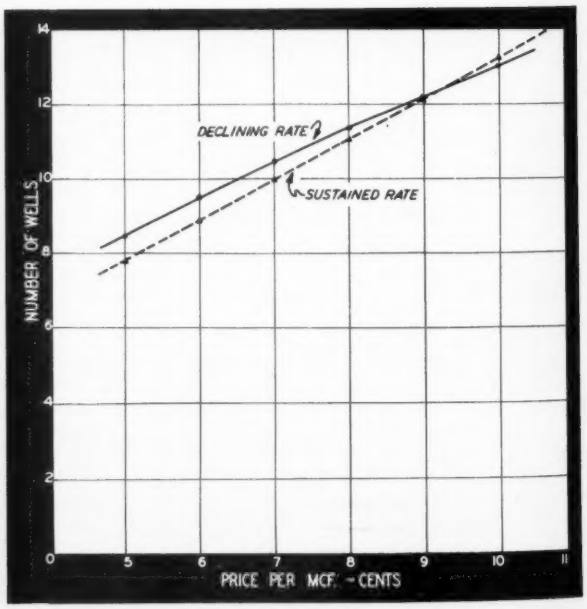
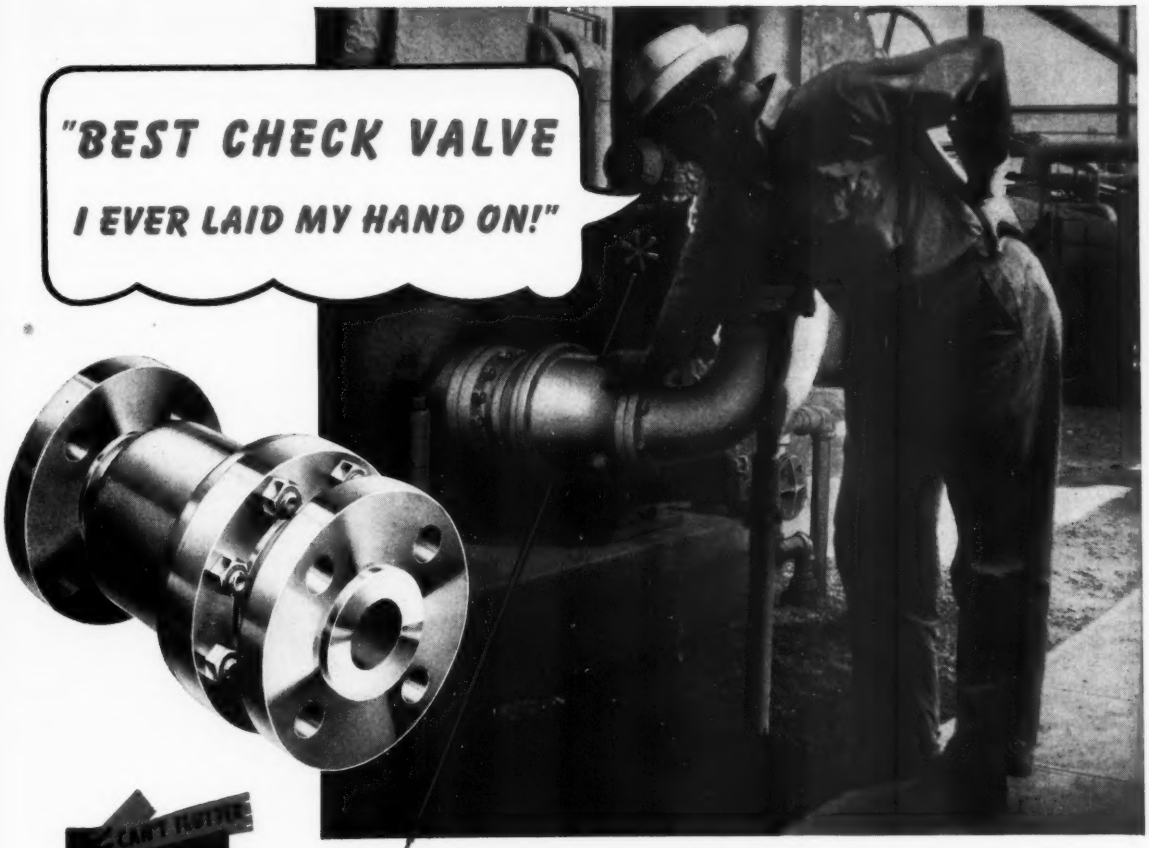
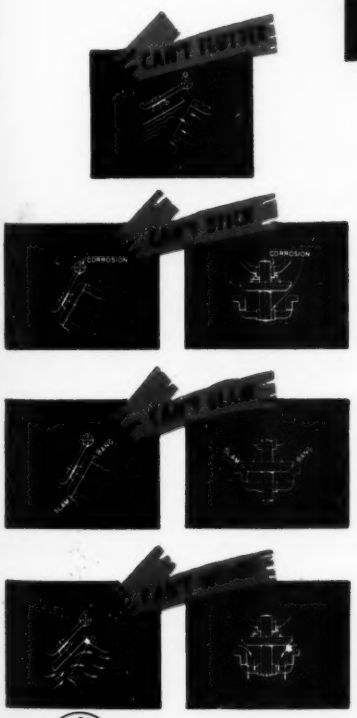


Fig. 2

"BEST CHECK VALVE I EVER LAID MY HAND ON!"





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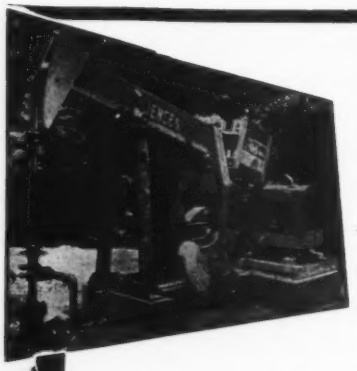

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spacings are obviously particular to the field and cannot be generalized.

The well-spacing problem can, therefore, be returned to its true sphere—economic.

The Economic Problem

Mathematical solutions to economic problems should be made only with the understanding that they are to be reexamined periodically to insure that the bases have not changed markedly. With such an observation a general solution to the well-spacing problem, showing at least the general variation of spacing with the major parameters, can be made under the following assumptions:

1. Flow in the reservoir is viscous and isothermal.
2. The gas obeys Boyle's law.
3. All wells are operated constantly at back-pressure equal to a constant fraction of the closed pressure.
4. The optimum spacing is defined as that spacing yielding the maximum net income to the producer.

While none of these conditions are essential, they do permit a simple solution and do not differ markedly from actual practices.

The gas from these wells may be produced either at a constantly declining rate to produce a maximum income or at a constant rate to satisfy pipe-line requirements. The first is analytically simpler but is impractical and results in a spacing not greatly different from the analytically more difficult one of sustained capacity.

Results shown in Figs. 1, 2, and 3 are based upon a field of the following constants:

Production area, acres	4,720
Net thickness, feet	20
Porosity, per cent	20
Interstitial water, per cent	30
Reservoir pressure, atmospheres	200
Reservoir temperature, °F.	200
Deviation factor	1.1
Reserve per acre (15 lb.), M.c.f.	21,200
Reserve for field, billion cu. ft.	100
Time on which income is calculated, years	10
Operating expenses per well per year	$1,000

Variables are taken to be price per M.c.f., cost per well, and initial capacity per well. These are assigned certain basic values:

Price per M.c.f. ($)	.05
Cost per well ($)	100,000
Initial capacity per well, M.c.f. per day	10,000

Certainly the most noteworthy point about the results is that the spacing is not greatly affected by considerable change in the variables. The calculated spacings are very similar to those used in actual practice. The economic factors involved in gas production have led to a spacing in general accord with theory.

The Analytical Solution

Under viscous, isothermal flow the capacity of J wells in a field will be:

$$C = J\phi(P_r^2 - P_w^2) \qquad (1)$$

Where P_r and P_w are the reservoir and working pressures. The amount of gas in the reservoir is proportional to the pressure. Then, since $\beta P_k = R_k$:

$$C = J\phi\beta^2(R_r^2 - R_w^2) \qquad (2)$$

If each well is produced at a rate such that $P_w \propto P_r$ then:

$$\frac{dw}{dt} = J\phi\beta^2 b R_r^2 \qquad (3)$$

Where W is the cumulative withdrawal from the reservoir. Therefore:

$$t = \frac{1}{J\phi\beta^2 b}\int_o^W \frac{dw}{(R_o - W)^2} \qquad (4)$$

R_o = initial reserve.

$$W = R_o\left[1 - \frac{1}{1 + \frac{C_J J t}{R_o}}\right] \qquad (5)$$

With a gross income of ψW, a cost per well of Φ and annual operating expense of Θ:

$$I = \psi W - J(\Phi + \Theta t) \qquad (6)$$

$$I = \psi R_o\left[1 - \frac{1}{1 + \frac{C_J J t}{R_o}}\right] - J(\Phi + \Theta t) \qquad (7)$$

The maximum value of I is obtained by differentiating (7) with respect to J and equating to zero:

$$J_{Max.} = \frac{R_o}{C_J t}\left[\left(\frac{\psi C_J t}{\Phi + \Theta t}\right)^{1/2} - 1\right] \qquad (8)$$

If the capacity is to be maintained for t years at a constant value the income equation and the well spacing become:

$$1 = \psi C_J J_o t - \phi J_o \frac{1}{\left(1 - \frac{C_J J_o t}{R_o}\right)^2} - \frac{\Theta R_o}{C_J}\left[\frac{1}{1 - \frac{C_J J_o t}{R_o}} - 1\right] \qquad (9)$$

$$\psi C_J t = \frac{\Phi + \Theta t}{\left(1 - \frac{C_J J_o t}{R_o}\right)^2} + \frac{2\Phi\frac{C_J J_o t}{R_o}}{\left(1 - \frac{C_J J_o t}{R_o}\right)^2} \qquad (10)$$

C_J = initial well capacity
J_o = initial number of wells

List of Symbols

C = capacity, M.c.f./day
C_J = capacity per well, M.c.f./day
J = number of wells
$\phi = \dfrac{\delta\pi a k}{\mu \log r_r/r_w}$
δ = constant
P_r = reservoir pressure
P_w = working pressure at well bore
β = constant of proportionality = $[A\,a\,\sigma\,(1 - s)]^{-1}$
A = area of reservoir, sq. ft.
a = sand thickness
σ = porosity
s = interstitial water
R = reserve
W = withdrawal from reservoirs
t = time
ψ = price per M.c.f. at well
Φ = investment per well
Θ = annual operating expense per well
I = net income
r = as subscript, reservoir
w = as subscript, well
o = as subscript, initial
k = permeability
b = constant

BOOKS

MINERALS OF CALIFORNIA. Bulletin No. 136 of State of California Department of Natural Resources. By Joseph Murdoch and Robert W. Webb. 402 pp.

This volume represents one of the cooperative projects being carried on by the Division of Mines and University of California. It describes 516 definite minerals besides many subspecies or varieties. This number represents about one-quarter of the total in the world. California is noted for the discovery of new mineral species, 56 of which were originally found for the first time in California, and 39 of these 56 species have, to date, not been found elsewhere in the world.

IRON RESOURCES OF CALIFORNIA. Bulletin No. 129 of State of California Department of Natural Resources. Prepared under direction of Olaf P. Jenkins. 304 pp.

This bulletin contains 16 individual articles contributed by various authorities on the geology and iron-ore resources of the state. As these individual reports were finished they were made available as preprints to the public. Now that all the chapters have been completed, they have been assembled into one bulletin as a comprehensive and authoritative treatise. The work is liberally sprinkled with topographic, geologic, magnetic, profile, claim, and index maps.

ANALYSES OF COMPLEX MIXTURES OF GASES. Bulletin 471 of U. S. Department of the Interior. By S. H. Ash and E. W. Felegy. Printed by U. S. Government Printing Office, Washington. 202 pp. 75 cents.

The purpose of this report is to point out what the mine-management official, the safety engineer, and the chemist can do to utilize analyses of complex gas mixtures as a basis of safe procedure to (1) control and extinguish fires in mines, tunnels, and industrial plants and (2) to prevent explosions when dealing with explosive mixtures and sources of ignition. It is designed to meet the needs of those desiring to utilize analyses of complex-gas mixtures for these purposes. Anyone who has knowledge of decimal fractions and simple graphs can learn to use the formulas discussed. Many typical examples are calculated and discussed in detail to show the application of the material presented.

Laboratory-Prepared Drilling Muds

(Continued from page 79)

tic and quebracho contribute very little to the water-loss reduction in this mud which contains a small concentration of soluble calcium salt.

For additions of sodium chloride up to 20,000-30,000 p.p.m. (in the water phase) to a normal-pH mud containing NaCMC, there is little or no effect on the filtration rate. Fig. 5 shows the adverse effects of a high concentration of sodium chloride on NaCMC-treated muds. Data are presented for the addition of salt both prior to and after incorporation of the NaCMC and, in all cases, a lower filtration rate is maintained if the NaCMC is in the mud prior to the salt contamination. The simplest solution to high salt contamination is to add more NaCMC and control the viscosities with caustic and quebracho.

The viscosities and gel strengths of many of the NaCMC-treated muds are excessively high, particularly so in those systems which contain a relatively large amount of the swelling-type clays. As illustrated by the data in Table 3, these properties can be improved by treatments with caustic and quebracho. Generally a pH in the range of 11.5 is optimum for this method of treatment. Dilution or conversion to a lime-base mud may be necessary to reduce the viscosity of very high solids muds, and heating, which simulates conditions encountered in a well, also will gradually reduce viscosity and gel strengths.

In some mud systems, dosages of NaCMC to about 1 lb. per barrel produce a decrease in mud viscosities and gel strengths, while a higher dosage increases viscosities but maintains low gel strengths. This was the case, for example, with the 27.3 per cent Stephens clay and the 3.08 per cent Attapulgite muds.

One other point of interest in regard to the control of viscosities by NaCMC is worth mentioning in that it well illustrates the complexity of drilling-mud systems. When caustic (NaOH) is added to many mud systems, the initial effect is a rapid increase in viscosity. Ultimately, after aging and correct pH adjustment, a viscosity decrease results from the caustic treatment. In conditioning drilling mud to usable characteristics this initial viscosity increase caused by caustic is ordinarily eliminated by a simultaneous addition of quebracho. The EB-10-F mud exhibits this initial viscosity increase when caustic is added. Tests show that NaCMC has the ability of maintaining a low-viscosity EB-10-F mud in the presence of caustic. However, this treating property of NaCMC does not extend to all systems. It is also apparent that NaCMC alone produces more reduction in viscosity in the EB-10-F mud than caustic in combination with either quebracho or NaCMC.

The effect of heating at 95°-100° C. on the properties of muds treated with NaCMC will only be briefly mentioned as this will be the subject of a subsequent paper. In normal pH, fresh-water muds containing NaCMC (4.8 per cent bentonite and KB-10-F muds), the main effect of heating is a gradual reduction in the viscosity and gel strengths of the muds. The water-loss values remain essentially constant though over extended heating times a measurable increase may be observed. In muds containing electrolytes (for example, the EB-10-F mud), heating produces a decrease in the viscosities and gel strengths and also a significant increase in water-loss values under certain conditions. Data obtained demonstrate that a significant increase in the water-loss values occurs only with a low concentration of NaCMC in the mud and show that the increase occurring with low concentrations of NaCMC can be eliminated by a correct treatment of the mud with caustic and quebracho.

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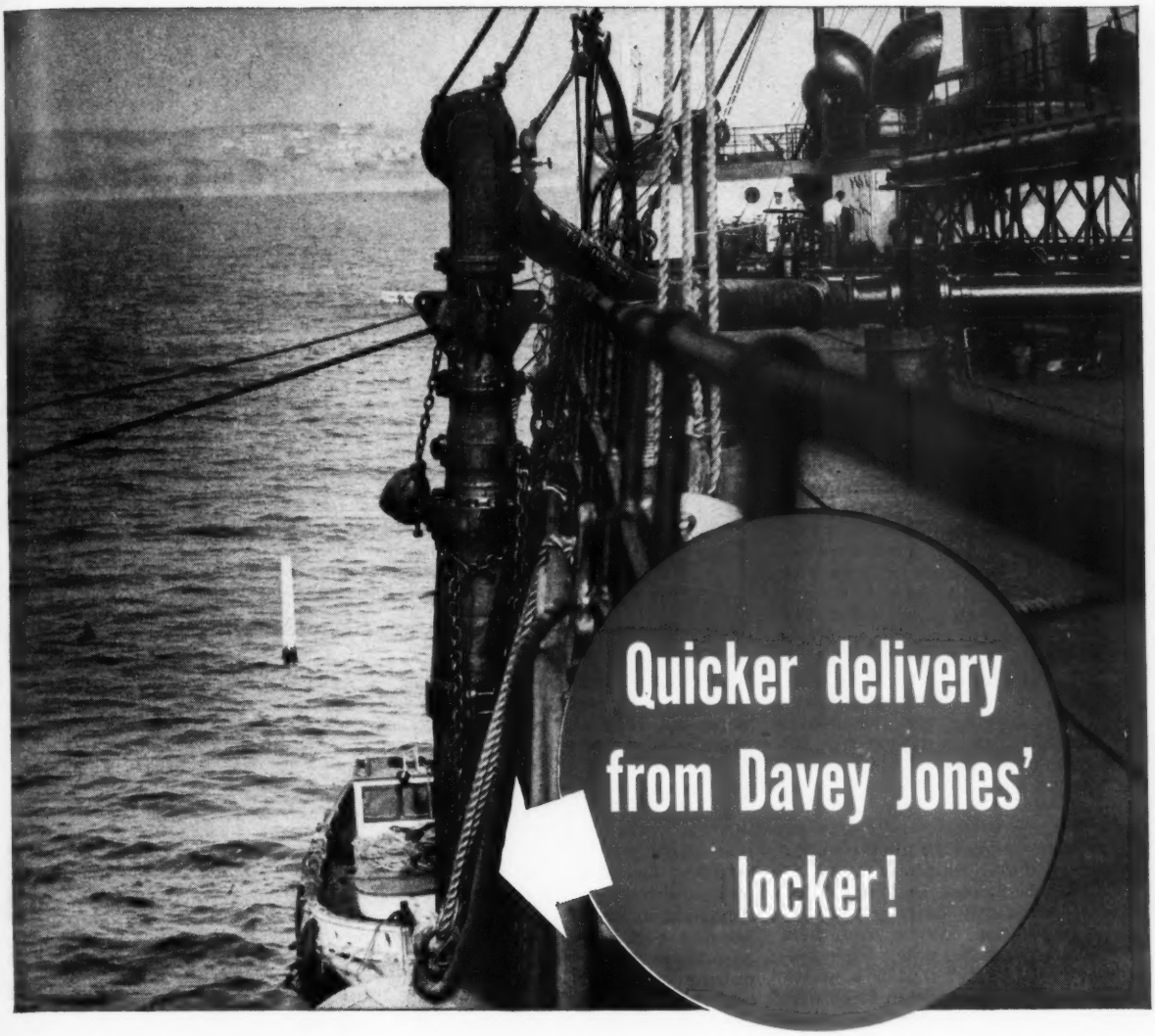
2. H. H. Kaveler—The Oil and Gas Journal, July 6, 1946, p. 81.
3. J. R. Pettigrove—The Oil and Gas Journal, October 11, 1947, p. 170.



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ACCOUNTING for the DRILLING CONTRACTOR

by Ralph U. Maddox

THIS very interesting article on cost accounting—one of the most important parts in the business of contract drilling—gives highlight information on several features:

1. The three different methods of cost accounting.
2. Depreciation charges in "inflationary" periods.
3. Cost data for bidding on contracts.

The author, a certified public accountant, is with Big West Drilling Co., 606 Dallas National Bank Building, Dallas.

THE operation of drilling rigs basically entails many of the same features that go into the operation of a manufacturing plant. For the drilling-rig operation, we have equipment, machinery, and supplies, and we have men to operate these items in a specialized and partly predetermined manner. That is, we cut hole, we core, we ream, we drill-stem test, we run casing, and do all such items that must be done to finish a complete well. The usual type of manufacturing plant also has these same basic factors in its operation—equipment, machinery, supplies, and the men to perform the manufacturing—but the operation is conducted at a fixed or permanent location month after month.

Thus, one big distinction between the drilling contractor's operation and the manufacturer running his factory is that for the former, the contractor's rigs are constantly moving from location to location, maybe from field to field or state to state. This feature of "movability" that is a necessary part of his business in large part brings about the unusual accounting problems that are faced by the drilling contractor.

A drilling contractor operating 20 rigs can be likened unto a manufacturing concern having 20 plants widely scattered and varying in size from those costing $100,000 to $500,000 each, with the further complications of these plants being dismantled and moved every 2, 3, or 4 months. It is usually not feasible to provide a cost clerk with each rig or group of rigs. It therefore is necessary that the major part of the cost information be obtained from nonclerical employes, which means that most of the information received by the cost accounting department is received in the "rough." This means that normally the job is charged at the time the item is purchased instead of at the date it is actually put into use. Normally, there is carried with each rig spare parts and supplies in an amount from $3,000 to $10,000, which items are charged to expense when purchased, as set out above.

Three General Methods

There are three general methods of accumulating drilling cost to determine the unit cost of drilling operations and each method has its own place or advantages. Unit cost is generally expressed in terms of operated days. However, unit cost may be expressed in terms of footage drilled, but due to the fact that the footage cost might vary considerably among different locations, even in the same field, the cost per day gives a better comparative figure. In comparing per-day cost, we should only compare those items that occur with the passing of time, as certain items of cost are approximately the same whether the time to drill the well is 30 or 90 days. In a hard formation the drilling cost per foot would be much higher than it would be in a soft formation and some of the per-day cost in the hard formation is greater than it would be in a soft formation, and vice versa, but the overall per-day cost will vary much less than the footage cost.

The major classification of operating expense is as follows:

1. Labor and supervision. — Labor, payroll, taxes, insurance, toolpushers' salary, and automobile expense.

2. Consumable supplies.—Hand tools, valves, fittings and line pipe, oils and greases, and rope.

3. Maintenance and repairs.—Shop work and replacement of all equipment. These items might be segregated in such a manner so as to determine the cost of maintaining the major classification of equipment: draw works, pumps, power and transmissions, overhead equipment, rotary, drill pipe, and drill collars.

4. Depreciation.—Rig and drill stem.

5. Overhead.—Salaries, office expense, traveling and administrative expense.

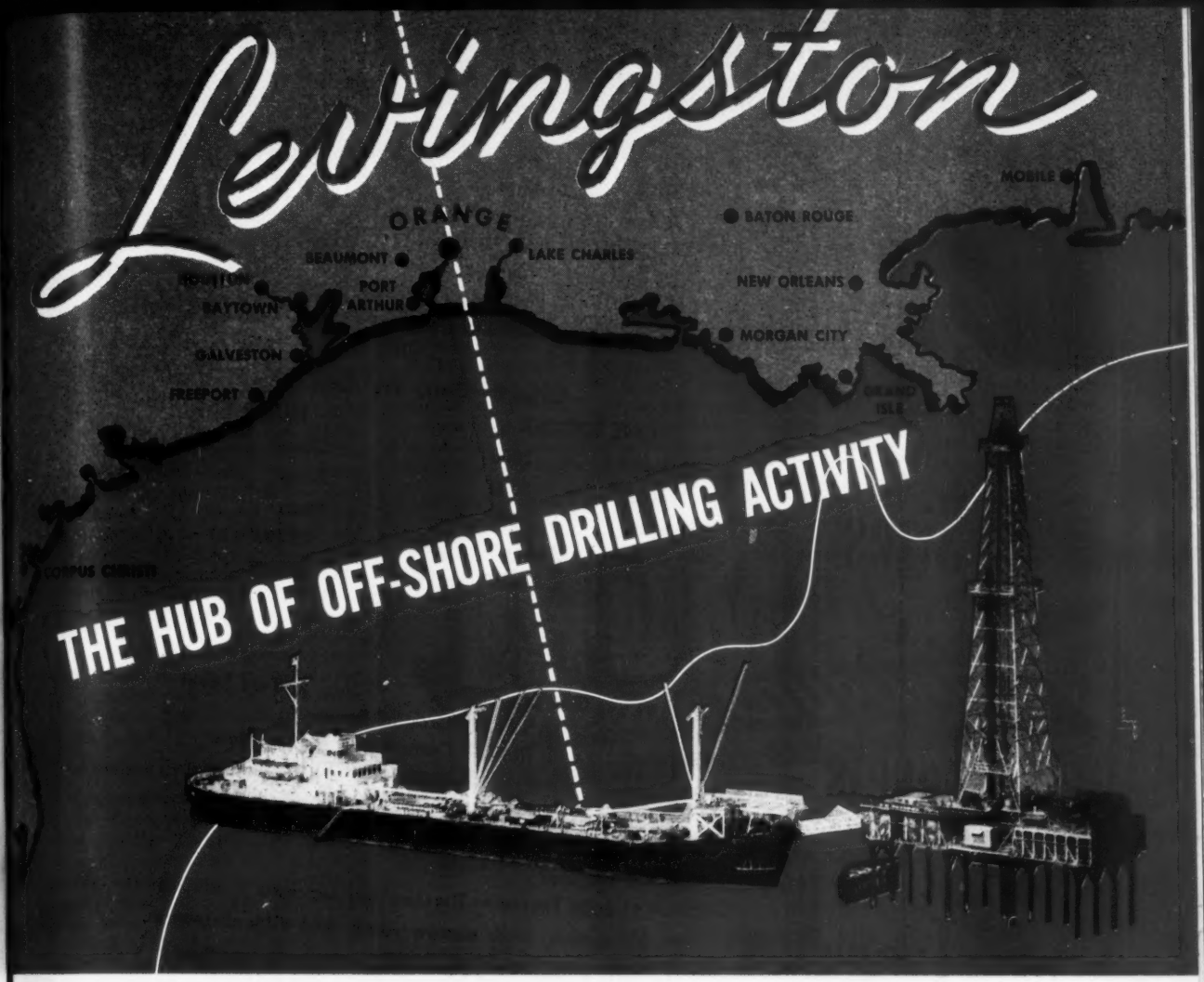
6. Other charges.—Bits and reamers, transportation in and out, derrick up and down, fuel, water, clearing road and location, and digging pits, mud and chemicals (if furnished by contractor).

Each of the above major classifications can be segregated into any number of subheadings depending upon the need or desire of the management. Most of the cost, except the last mentioned as "other charges," occurs by the lapsing of time, while the rest of the charges are more or less fixed by certain prevailing factors, such as location and type of formation.

The first method of cost accounting is the accumulation of operating cost by drilling units and then prorating the cost thus obtained to the specific job or well being drilled on the basis of operated days. This method of accounting is generally used in connection with workover operations and on wells requiring only a very short time to drill. Even under this method, some items of cost, such as moving rig in and out of location, cost of erecting and dismantling derrick, digging mud pits, water and fuel cost, might be charged to the individual well.

The second method is the accumulation of all of the operating cost by individual wells. This method is used by the majority of the contractors and will be discussed in more detail later.

The third method is the accumulation of operating cost pertaining to the depreciation and upkeep of the rig, such as repairs and replacements, by drilling units and then prorating this cost on an operated day basis. All other cost, such as cost of moving in, erecting and dismantling derrick, digging mud pits, water, fuel, labor,



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taxes, insurance, and consumable supplies applicable to the individual well, is charged to the particular well. This method has advantage over the second method in that each well is more likely to be charged with its correct proportionate part of rig maintenance than under the second method.

The second method, which is most commonly used, gives a distorted picture if we consider the cost on only one well, due to the fact that repairs and replacements on the particular well might have been abnormal—either high or low. However, by using two or more wells in our cost study, we usually obtain approximately the same results that would have been accomplished by the third method and with considerably fewer complications. Many large items of repairs and replacements, which are expensed by the drilling contractor, would undoubtedly ordinarily be capitalized in a manufacturing concern and spread over several months, but due to the great wear and tear on the equipment and the many hazards involved, the industry is convinced that it is more practical to expense these items as incurred.

Source of Information

The original source of the information is invoices, wage-time sheets, and drilling reports. The first two are assembled and coded similarly as in any other cost department, while the drilling report is a daily report giving operating data, and is very essential in making time and cost studies. If the cost is accumulated as outlined above, it is possible to determine the cost at various stages of the operation with the aid of a time study made from the daily drilling reports, such as cost of moving in, cost of rigging up, cost of setting surface pipe, midstring, and oil string, as well as the cost of each 1,000 ft. of hole drilled, with a fair degree of accuracy. In most cases it probably would not be advisable to make a detailed study on each well drilled, but the records should be maintained so that the information could be readily obtained if desired.

The direct cost, sometimes referred to as out-of-pocket cost, is only part of the actual cost of operating drilling rigs. In fact, in many cases it represents only two-thirds of the actual cost. The true cost includes an adequate amount to cover overhead, depreciation, and obsolescence. Overhead is sometimes difficult to allocate properly when the company is also engaged in production or other operations. The amount of depreciation to be included is not necessarily the depreciation based on the rates established by the Treasury Department.

In connection with depreciation and obsolescence, I would like to discuss briefly my pet theory regarding this very important item in an inflationary period; that is, in bidding on all wells and in determining the profit on wells drilled, the approximate prevailing replacement cost of a drilling rig should be used in calculating the depreciation instead of using the depreciation based on the actual cost. As an example, the cost of a 12,000-ft. rig in 1942 might have been $175,000 and the same rig in 1948 would be $350,000. The depreciation rates would be $145 per day based on the 1942 cost and $291 per day based on the 1948 cost, which latter cost should be used.

If, however, we use the 1942 cost, the profit thus computed is not a true competitive profit from operations, but instead is a profit from appreciation of rig investment due to an advantageous purchase date. In other words, whether the rig was purchased in 1942 or 1948, the rate of depreciation should be relatively the same, if the rigs are capable of performing approximately the same functions. In reality, this is the same as selling a residence that cost $7,500 in 1942 for $15,000 in 1948, and then having to purchase another one for relatively the same use for $17,500. Instead of making a profit of $7,500 on the sale, actually a $2,500 loss is sustained.

The reverse would hold true in a deflationary period for the contractor would be forced to follow this same principle of present value versus cost, because if he had a 1948 rig that cost $350,000 which could be bought in 1953 for $175,000, then he would be

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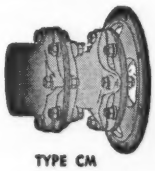
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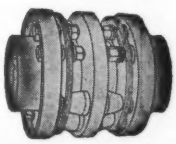
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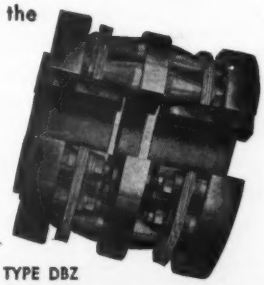
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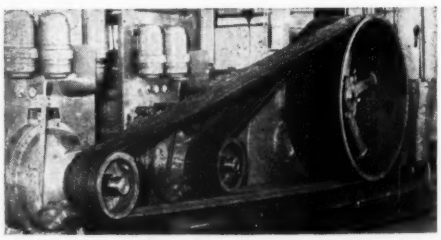

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forced by competition to scale down his depreciation based on the then present-day cost, that is, for bidding purposes at least. I do not advocate these principles in keeping the records and determining the book profit, but I do advocate them for bidding purposes and also in considering current operating, dividend, expansion, and investment policies.

There are many hazards and unknown factors in drilling operations which make it very difficult to bid wells on a footage basis, which is the basis now commonly used, without over or under bidding. If an operator obtains six or more bids and awards the work to the lowest bidder, he will usually pay a lesser amount than the work actually warrants which is an undesirable condition now prevailing in the industry.

The cost data accumulated in light of the above are useless unless they are properly used in estimate well cost on future wells. The cost data, which could be called the standard cost, might be used as an aid in future bidding on a 12,500-ft. well as follows:

COST DATA FOR BIDDING ON 12,500-FT. WELL

Cost of moving in and out	$7,000
Erecting and dismantling derrick	4,000
Labor and supervision, 100 days @ $275	27,500
Consumable supplies, 100 days @ $75	7,500
Maintenance and repairs, 100 days @ $150	15,000
Water and fuel, 95 days @ $75	7,125
Bits, 100 @ $130	13,000
Depreciation:	
Rig, 90 days @ $165	14,850
Drill stem, 85 days @ $125	10,625
Overhead, 100 days @ $55	5,500
Total cost	$110,100
Cost per foot for 12,500 ft.	$8.80
Cost per day—with drill pipe	1,050.00
Cost per day—without drill pipe	795.00
Over-all cost per day	1,101.00

A normal profit should be added to the 12,500-ft. cost-data tabulation, together with a sufficient amount to cover additional cost, if the drilling time exceeded 100 days.

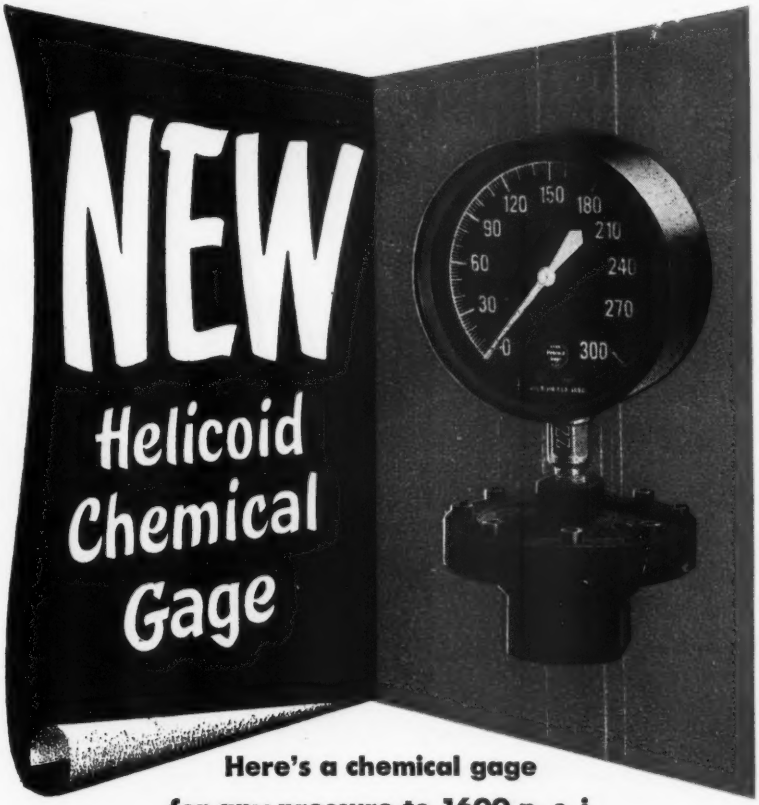
In practice a bid is not as easy to compile as the above might appear to be as it takes a great deal of know-how and estimating to determine the factors upon which to make the bid.

Some of the above principle, no doubt, could be applied to other types of business after proper modification.

Union Sulphur Purchases Mackhank Petroleum Stock

HOUSTON.—Union Sulphur Co., Inc., has purchased 75 per cent of the stock of the Mackhank Petroleum Co. of Houston, according to H. F. Whiton, president of Union Sulphur.

D. C. Ellwood has resigned the presidency of Mackhank and a successor has not yet been appointed. Purchase price of the stock has not been announced.



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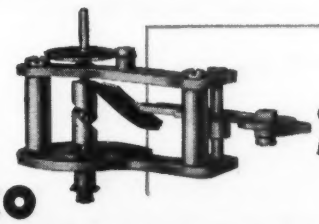

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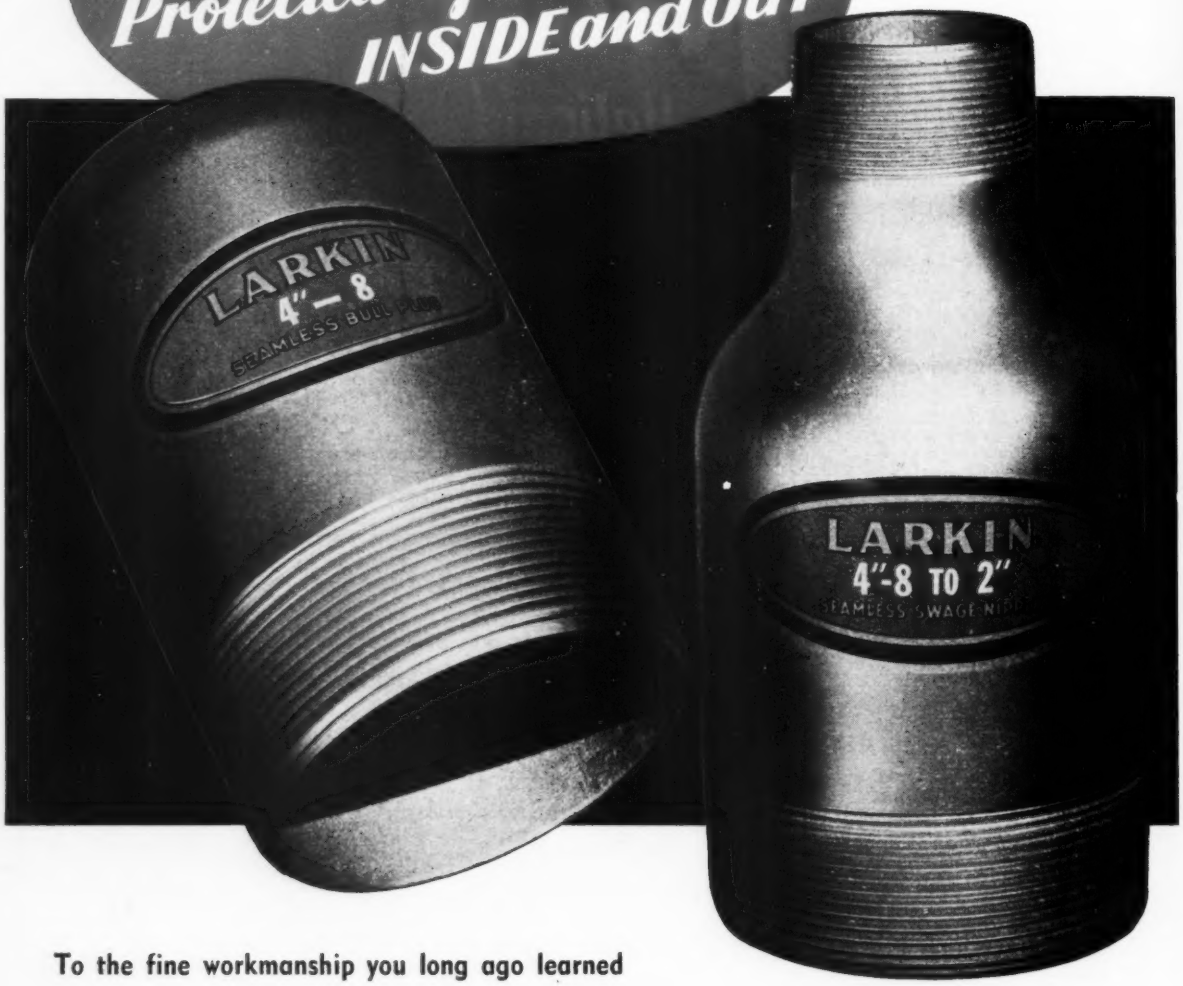

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8. Chart for Simplified Material-Balance Equation—Low Fractional Withdrawal

THE accompanying chart is for the solution of the equation,

$$n/N = \frac{u - u_o}{u + (r_p - r_o)\,v} \qquad (1)$$

where

n/N = fractional stock tank oil produced at present time.

u = two-phase formation-volume factor at present time.

u_o = two-phase formation-volume factor at original reservoir pressure.

r_o = gas in solution at original reservoir pressure, S.C.F. per stock-tank barrel.

r_p = the cumulative net gas-oil ratio, S.C.F. per stock-tank barrel.

v = gas conversion factor from S.C.F. to barrels in reservoir at present time.

This equation is a special form of the material balance equation for zero water drive and no original gas cap.

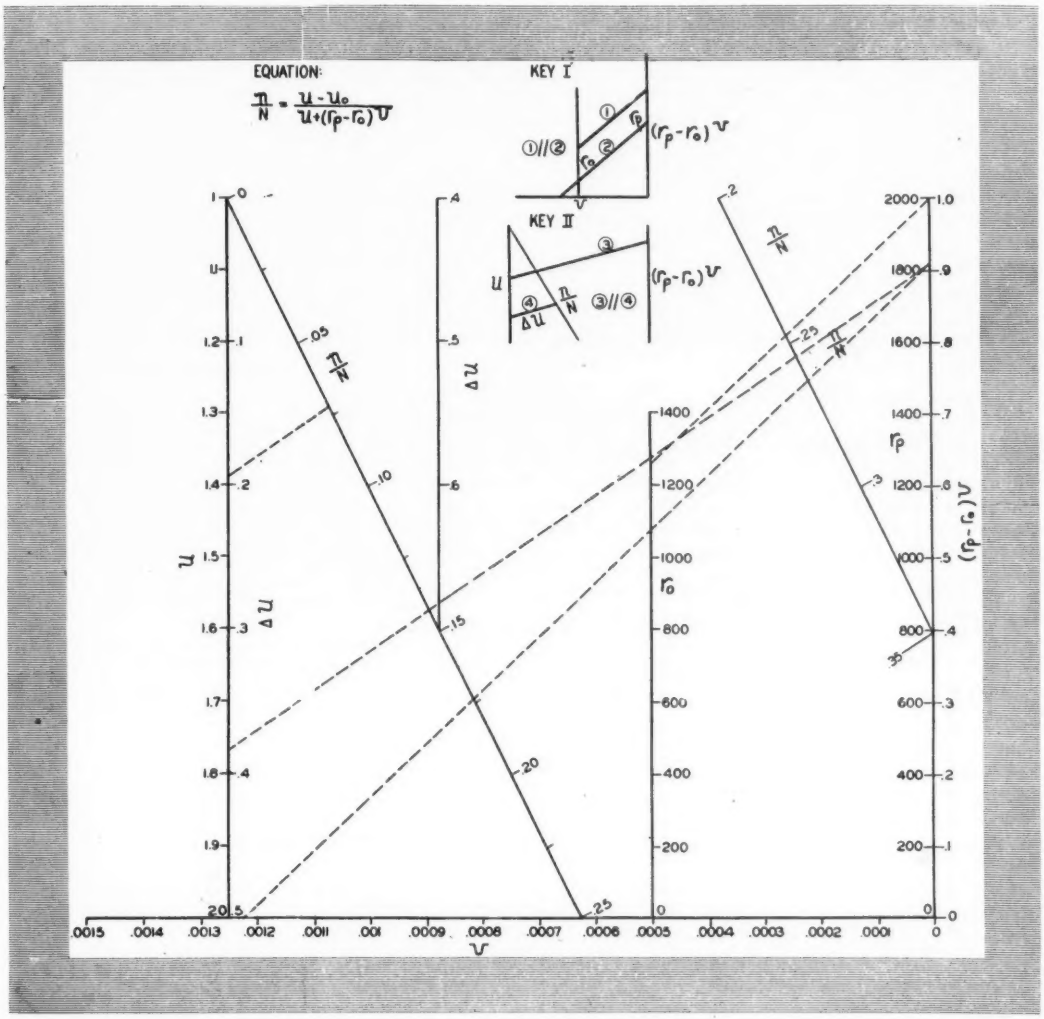
The chart has been prepared to cover a range of variables such that accuracy is obtained for low fractional withdrawals. The quantity $(u - u_o)$ is given as Δu. The Δu scale and n/N scale can be used in multiples of 10 provided both are so used, i.e., if Δu is read at one-tenth value, then n/N is given at one-tenth value.

As an example, for $r_p = 2{,}000$, $r_o = 1{,}260$, $v = .00122$, $u = 1.769$, $u_o = 1.575$, $u - u_o = .194$.

$$n/N = \frac{.194}{1.769 + (2{,}000 - 1{,}260)\,.00122}$$

$$= .0727$$

The chart gives $n/N = .072$.



(Chart by R. C. Newman, G. Pernalete, and R. M. Caywood, University of Oklahoma.)

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

General Plant Greases

Can you classify greases for us? We are a manufacturing company and know little of the greases we should use for our various equipments.—R. C. P.

There are so many greases, and so many services that long experience and much attention is required to be able to make wise selections. The general uses of greases is discussed in W. G. Forbes Lubrication of Industrial and Marine Machinery (John Wiley & Sons, Inc., New York). However, the material in Forbes is spread through many pages or chapters, and hence the recent article by H. A. McConville, Selection of Greases for General Plant Use (Plant Engineering, August 1948, page 16) is suggested. The following material is taken primarily from the McConville article:

Table 1 shows nine typical greases that will serve most of the needs of a manufacturing plant. They are the greases used in the Schenectady works of General Electric Co.

No. 1—Motor, ball, and roller bearing grease.—Although about 95 per cent of the services can be handled by ordinary grades of ball and roller-bearing greases, a sodium calcium base (or sodium base) grease is recommended so that all services can be satisfactorily handled. Such a grease should be able to operate continuously at 175° F. or at 200° F. or intermittent service, and at the other extreme at —25° to —30° F. for outdoor installations. At these low temperatures it should be soft enough to be applied without too much exertion through a hand-operated grease gun but not so soft that it leaks from position at higher temperatures.

No. 2—Cup grease.—These are used for slides, machine ways, and filling cups on machinery that does not have ball or roller bearings. Thus, an oil of 300 viscosity rather than the customary low (even 100) viscosity oil should be used in the grease.

No. 3—Pressure lubricator.—Much large machinery such as punch presses, lathes, and boring mills, are equipped with pressure lubricator or one-shot systems. A grease for such a purpose must be soft enough to be forced through long lines. The tendency to "bleed" at high temperatures or to separate under pressure is alleviated by the use of an oil (in the grease) of 500-800 viscosity rather than the low-viscosity oils customarily used.

No. 4—Silicone greases.—Silicone rather than petroleum-base lubricants are required for extremely high-temperature services such as 350°-400° F. They are expensive but they are about the only kind of grease available for such services and they often perform satisfactorily at 400° F. for several hundred hours.

No. 5—High-temperature petroleum greases.—These cheaper greases can be used for motors over drying ovens, rollers on heat-treating furnaces, conveyor chains through ovens, etc., up to temperatures of 230° F. If the operating speed is over 5,000 r.p.m. a grease of 200-240 consistency rather than the 240-270 variety suggested here, would be more satisfactory.

No. 6—Waterproof greases.—Such greases are used for hydraulic rams, large water valves, equipment that is sprayed with water, etc.

No. 7—Low temperature.—For temperatures below about —25° F., the high consistency lithium greases containing low-viscosity oil may be used.

Nos. 8 and 9—Graphite lubricants.—Graphite greases may be advisable for degreasing equipment, high-load crane gears, or in greasing the shafts of elevators.

Catalytic Cracking Capacity

How much catalytic cracking capacity is there now? Does it exceed the capacity of regular cracking plants?—R. P. C.

Thermal cracking capacity still exceeds the catalytic cracking capacity particularly if thermal reforming is counted as thermal capacity. According to Information Circular I.C. 7483, August 1948, Petroleum Refineries, Including Cracking Plants in the United States, January 1, 1948, by F.S. of the U. S. Bureau of Mines, capacities in 1947 and 1948 in barrels per day of gasoline product were:

	Jan. 1, 1947	Jan. 1, 1948
Reforming	283,515	275,505
Thermal cracking	807,729	842,828
Catalytic cracking	423,378	505,825
Total	1,514,622	1,624,158

The fluid catalyst process seems to dominate the catalytic cracking capacity. In terms of "barrels of feed stock" the capacity, since 1942, has grown as follows:

Year	Barrels per day
1942	33,500
1943	139,500
1944	432,500
1946	500,500
1947	505,500
1948	567,500
On order	768,500

At a yield of 45 per cent, the 1948 gasoline production by fluid catalytic cracking would be 255,000 bbl. per day.

TABLE 1—A SELECTION OF GREASES FOR GENERAL PLANT USE

No.	Type of grease	Consistency as received	Worked consistency	Soap base	Water solubility	Continuous operation, °F.	Intermittent operation, °F.	Visc. of oil in grease, S.S.U. at 100° F.
1.	Motor, ball and roller bearing	260-290	270-290	Na-Ca or Na	Yes	—30 to 175	—25 to 200	250-400
2.	Cup	215-245	225-255	Ca	No	—30 to 150	—25 to 175	300
3.	Pressure lubricator	310-340	320-350	Ca	No	—30 to 150	—25 to 175	500-800
4.	Silicone grease	200-230	220-250	Li	No	—30 to 400	—20 to 425	300 up
5.	High-temperature grease	230-260	240-270	Na	Yes	—10 to 210	0 to 230	300 up
6.	Waterproof	280-310	300-330	Zn	No	—30 to 140	—25 to 160	Over 250
7.	Low temperature	250-320	270-320	Li	No	—67 to 160	—60 to 170	60-80
8.	No. 2 graphite	250-280	265-295	Ca	No	—30 to 150	—25 to 175	200-300
9.	Semifluid graphite grease			Na	Yes	—30 to 175	—25 to 200	Over 500

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10 GOOD REASONS WHY OPERATORS PREFER

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1. **MEETS EVERY CONDITION.** Guns fired either electrically or mechanically: guns run on cable, sand line, drill pipe, tubing, or on piano-wire measuring line in extremely high-pressure wells.
2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
3. **ACCURATE DEPTH MEASUREMENTS** put the shots right where you order them.
4. **MAXIMUM PENETRATION** of bullets into the formation, as proved repeatedly in competitive field tests.
5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
6. **ALL SIZES OF BULLETS** from $\frac{1}{8}$" dia. up to $\frac{3}{4}$" dia., to fit every possible need.
7. **BURRLESS BULLETS,** giving a completely burr-free hole, eliminating casing scraping, with *no* sacrifice of penetration.
8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
9. **EXPERIENCED MEN.** With years of experience behind them, thoroughly-trained McCullough gun-perforating crews do their jobs quickly, efficiently, safely.

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ENGINEERING fundamentals

Encroachment of Water Into a Dry Bed

FOR the purposes of computing displacement of oil by water, it is frequently useful to employ concepts derived from simplifying cases. One such simple case is that of water filling up a dry bed from an injection well. The application can be made to a linear or to a radical system.

Consider a linear system into which water has encroached a distance x. (See Fig. 1.) Since the bed originally was dry there is negligible resistance to flow ahead of the water front. When the front of encroachment is at the point x, the instantaneous rate of flow is given by Darcy's law as:

$$Q = \frac{k\,A\,(P_w - P_e)}{\mu\,x} \qquad (1)$$

The total volume of water which has been injected at this time is given by:

$$V = A \times \Phi \qquad (2)$$

Where Φ is the porosity of the bed. It is assumed that complete filling of the pores occurs.

The derivative of V with respect to time is the instantaneous rate Q. Thus, combining Equations 1 and 2 gives:

$$Q = \frac{dV}{dt} = A\Phi\,\frac{dx}{dt} = \frac{k\,A\,(P_w - P_e)}{\mu\,x} \qquad (3)$$

This can be integrated from $x = 0$ at time zero to $x = x$ at time t to give:

$$\Phi\,\frac{x^2}{2} = \frac{k\,(P_w - P_e)\,t}{\mu} \qquad (4)$$

Eliminating x between Equations 4 and 1 yields a relationship between the rate of encroachment and time:

$$Q = A\sqrt{\frac{k\,\Phi\,(P_w - P_e)}{2\,\mu\,t}} \qquad (5)$$

A similar approach is applicable to a radial system. Thus, when the front of water encroachment has reached a radius R, a similar set of equations apply:

$$Q = \frac{2\pi\,kh\,(P_w - P_e)}{\mu\,\ln R/R_w} \qquad (6)$$

$$V = h\,\Phi\,\pi\,(R^2 - R_w^2) \qquad (7)$$

$$Q = \frac{dV}{dt} = 2\pi\,h\,\Phi\,R\,\frac{dR}{dt} = \frac{2\pi\,kh\,(P_w - P_e)}{\mu\,\ln R/R_w} \qquad (8)$$

This last equality can be integrated to give:

$$\frac{k\,\Delta P\,t}{\Phi\,\mu} = \frac{R^2}{2}\ln\frac{R}{2} - \left(\frac{R^2 - R_w^2}{4}\right) \qquad (9)$$

This equation can in turn be combined with Equation 6 to give Q as a function of time. The analytical expression is too complicated to be given here, but Fig. 2 is a curve of decline in injection rate calculated by use of Equations 6 and 9. This particular approach is useful in estimating the injection rates of water injection wells.

Relationships between injection rates and total injection volumes can be obtained by combining Equations 1 and 2 for the linear system or Equations 6 and 7 for the radial system. This gives respectively:

$$Q = \frac{k\,\Phi\,A^2\,(P_w - P_e)}{\mu\,V} \qquad (10)$$

$$Q = \frac{4\pi\,kh\,(P_w - P_e)}{\mu\,\ln\dfrac{V}{h\,\Phi\,\pi\,R_w^2}} \qquad (11)$$

To obtain Equation 11, R_w must be assumed as negligible in computing V by Equation 7.

For injection into horizons which are not dry, the term Φ must be replaced by the pore volume to be filled with water and the term k must be replaced by k_w, the effective permeability to water.

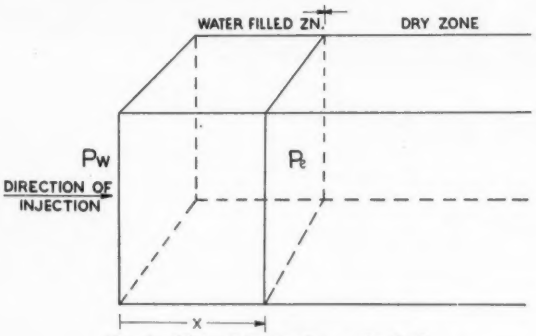

Fig. 1—Water injection into a dry bed

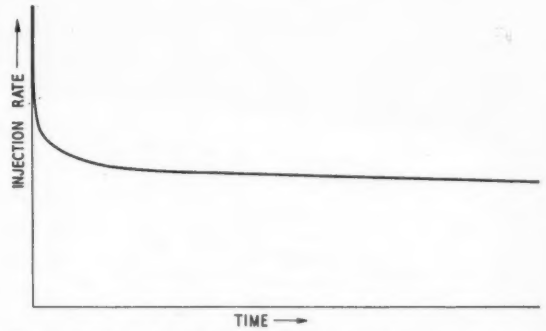

Fig. 2—Decline of radial injection rate under constant pressure

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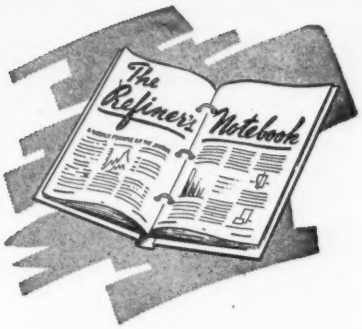
Cost-imating



A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Vessels

Note—Special steels, liners, cladding, indexes, and a computation of the cost of a vessel will be given in Cost-imating No. 10 of December 23, 1948.

TABLE 1—COSTS OF VESSEL OR TOWER STEEL, ETC. (1946)

	Unit	1946 costs M	L	M&L
Vessels,* fabricated, without connections::				
500 lb.[3]	ct./lb.	30-50	4.0	34-54
1,000 lb.[3]	ct./lb.	25-40	3.5	29-43
5,000 lb.[3 4]	ct./lb.	20-30	2.2	22-32
10,000 lb.[3 4]	ct./lb.	†15-25	1.5	16-27
20,000 lb.[3 4 5]	ct./lb.	†10-20	0.8	*11-21
50,000 lb.[3 4 5]	ct./lb.	†8-15	0.6	*8-16
Vessels, field fabricated	ct./lb.	12	8.5	21
Flanged nozzles, manholes, etc.[3]	$/lb.			.50-1.0
Couplings or collars, installed[1]	$/lb.			1.24
Erection in field:‡				
10,000-15,000 lb.[4]	$/job		425	
15,000-50,000 lb.[4]	$/job		845	
50,000 lb. up[4]	$/job		1,350	
Freight, carload lots (on 110 per cent of weight)	ct./ton mile			2.5

Stress-relieving,[2] 1 per cent of total—but a maximum of $500.00.
X-ray inspection,[2] about 3 per cent of total.

*Fowler & Brown[1] show only about 10 cents per pound for M & L and presumably refer to very heavy vessels. †Bliss[2] also shows only about 10 cents per pound for material. ‡Happel[3] states erection cost ranges from 5-10 per cent for the simplest vessels.

TABLE 2—APPROXIMATE INSTALLED COSTS* ($ EACH) OF FLANGED CONNECTIONS ON VESSELS OR TOWERS (1946)†

Inside diameter—	⅜-in. shell 300 lb.	⅝-in. shell 300 lb.	1-in. shell 300 lb.	1-in. shell 600 lb.	2-in. shell 300 lb.	2-in. shell 600 lb.	2-in. shell 900 lb.
2-in. nozzle	$21	$24	$29	$29	$45	$44	$57
4-in. nozzle	36	41	51	56	87	78	87
6-in. nozzle	52	62	81	93	136	132	143
8-in. nozzle	73	87	116	152	187	203	212
10-in. nozzle	96	115	159	199	242	292	310
8-in. handhole	68	74	87				
10-in. handhole	122	126	143				
12-in. handhole	169	176	191				
14-in. handhole	210	217	234				
14-in. manhole	210	248	286	335	397	472	627
18-in. manhole	280	335	404	515	554	702	870
22-in. manhole	372	451	549	715	740	962	1,260
26-in. manhole	487	584	706	...	938	...	...
30-in. manhole	602	723	875	...	1,172	...	...
36-in. manhole	833	946	1,163	...	1,528	...	...

*The costs of Fowler & Brown[1] raised from January 1941 by a material and labor factor of 0.805 (see Cost-imating No. 5 of November 18, 1948).

†The cost of 150-lb. manholes are about 80-93 per cent of the cost of the 300-lb.; and for nozzles 65-90 per cent of the cost of 300-lb. nozzles.

TABLE 3—APPROXIMATE WEIGHTS OF CYLINDRICAL SHELLS AND HEADS

Diam.	Shell, lb. per linear ft.				Head and bottom			
(ft.)	¼″	⅜″	½″	⅝″	⅜″	½″	⅝″	¾″
2′6″	80	121	161	201	344	393	491	589
3′0″	96	145	193	241	449	513	641	769
3′6″	113	169	225	281	568	649	812	974
4′0″	128	193	257	321	701	802	1,002	1,202
4′6″	145	217	289	361	849	970	1,212	1,455
5′0″	161	241	321	401	1,010	1,154	1,442	1,731
5′6″	177	265	353	441	1,185	1,354	1,693	2,133
6′0″	193	289	385	481	1,374	1,571	1,693	2,360
6′6″	209	313	417	521	1,578	1,803	2,254	2,700
7′0″	225	337	449	561	1,795	2,051	2,564	3,180
7′6″	241	361	481	601	2,026	2,316	2,894	3,470
8′0″	257	385	513	641	2,272	2,596	3,245	3,900
8′6″	272	409	545	681	2,531	2,892	3,615	4,330
9′0″	289	433	577	721	2,804	3,205	4,006	4,810
9′6″	304	457	609	761	3,902	3,533	4,416	5,300
10′0″	321	481	641	801	3,393	3,878	4,847	5,805
10′6″	336	505	673	841	3,709	4,238	5,298	6,350
11′0″	352	529	705	881	4,038	4,615	5,769	6,925
11′6″	369	553	737	921	4,382	5,007	6,259	7,515
12′0″	384	577	769	961	4,739	5,416	6,770	8,120
12′6″	401	601	801	1,001	5,110	5,841	7,301	8,760
13′0″	416	625	833	1,041	5,496	6,281	7,851	9,420
13′6″	433	649	865	1,081	5,896	6,738	8,422	10,100
14′0″	449	673	897	1,121	6,309	7,210	9,013	10,800
14′6″	465	698	929	1,161	6,787	7,699	9,624	11,530

TABLE 4—APPROXIMATE COST OF INSTALLED COUPLINGS[1] (1946), $ EACH*

½-in.	$2.00	2-in.	$4.35
1-in.	2.70	3-in.	10.35
1½-in.	3.60	4-in.	13.30

*Bliss[2] shows values nearly double.

References

1. Fowler & Brown, A.I.Ch.E., 39, 241 (1943).
2. Bliss, H., Chem. Eng., May 1947, p. 126.
3. Happel, Aries & Borns, Chem. Eng., Oct. 1946, p. 99.
4. Author's files.
5. Bummerstedt, E. F., Economic Design of Pressure Vessels, Lukens Steel Co.

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OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

by Craig Espy

(1) VERTICLOSED PUMP MOTOR. New deep-well vertical-pump motor is completely streamlined. It has an interchangeable base to permit increase or decrease in horsepower without the expense of rematching or exchanging the pump head. Waterproof housing protects vital parts of the motor. Downdraft ventilation prevents reentry of expelled hot air. Flush-style oil gages are made with Lucite windows, giving full visibility to oil supply. Lubriflush lubrication system permits thorough flushing out. Gravity-fed oil flow insures correct oil supply. Adjustable hollow shaft permits precise adjustment of pump impellers. *U. S. Electrical Motors, Inc.*

IT'S NEW ✓ CHECK IT

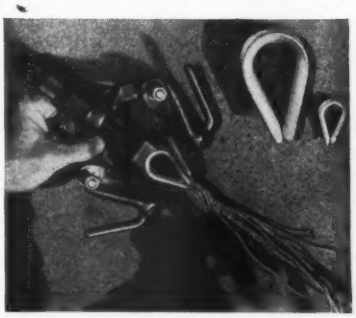
(2) BUTTERFLY VALVE. Used in the drilling, production, and refining divisions, valve is all-steel construction and manufactured to the close tolerance of 0.0005-in. machine fit. It is fluidtight upon closure. Butterfly reseats continually with use. Seats are self-cleaned during closing by flushing action of the butterfly. Valve can be welded into a line or to tankage, mud lines, sumps, and manifolds. It can be operated continually under fluid by remote control, as no lubrication is necessary. Although ordinarily furnished with butt-weld ends, it is also available, fabricated into Dresser couplings ready for installation on the line, or with Victaulic grooves. *Mud Products, Inc.*

IT'S NEW ✓ CHECK IT

(3) TERMINAL EXHAUST SNUBBER has been developed to use on four-stroke-cycle diesel and gas engines with relatively short exhaust systems; also for two-stroke-cycle gas-engine compressors operating on the Otto cycle. Units are available in pipe sizes from 5 to 14 in. inclusive. Snubber combines the tail pipe with the exhaust snubber and is intended for vertical mounting at the end of the exhaust system. No additional tail pipe is required. It gives effective noise control by dissipating the slug's energy before it is released to atmosphere. *Burgess-Manning Co.*

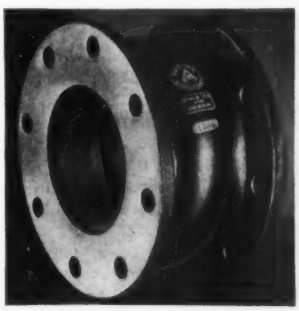
IT'S NEW ✓ CHECK IT

(4) SPLICING VISE. Easily adjustable vise holds wire firmly in place while being spliced, either in a stationary position or with a free swivel motion. Both greater speed and better splices result. Suitable for wire rope from ⅛ to ½ in. in diameter. Manufacturer has another product, Rigger's Fid, for more efficient splicing of manila or other fiber ropes. Fid is used like an ordinary marline spike except that a detachable hollow handle holds the rope strands apart and allows the easy insertion of the incoming strands. It leads to better, cleaner, quicker splices. *Fellows & Stewart.*



IT'S NEW ✓ CHECK IT

(5) GARLOCK RUBBER EXPANSION JOINTS. Flexible, rubber connections can be installed in pipe lines for the purpose of relieving stresses and strains in the piping and equipment. These joints compensate for linear expansion and construction due to temperature changes, also absorb vibration. They reduce or eliminate the transmission of undesirable noise, and compensate for minor misalignment in piping. Joints are made of high-grade rub-



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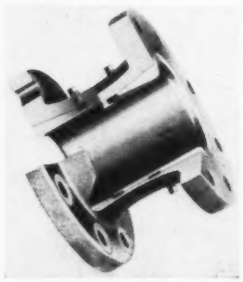
ber compound. The body of the joint is reinforced with steel wire or rings. For service where oil resistance is necessary, joints are available with a tube or liner made of neoprene. *Garlock Packing Co.*

IT'S NEW CHECK IT

(6) BETHLEHEM FLOW TUBE provides a definite change in the principles of flow metering. It uses viscosity as a criterion of flow. Flow tube consists essentially of a short-length pipe equipped with two groups of pressure nozzles around the inner periphery. One group points upstream, the other downstream. The nozzle groups are interconnected by common pressure rings from which connections are made to the high and low-pressure sides of a standard flow meter. The differential head impressed on the meter is the difference between the total head impressed on the nozzles pointing downstream and the total head impressed on the nozzles pointing upstream. The symmetry of this device permits measurement of flow in either direction. Normally less than one pipe-diameter in length it can be installed at any section of a pipe line with no straight run limitations. By offering a negligible resistance to flow it saves power. It also costs less to install. *Bethlehem Foundry & Machine Co.*

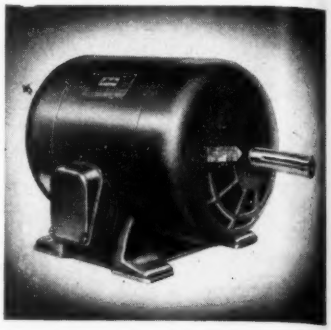


IT'S NEW CHECK IT

(7) MUD-MIXING UNIT is designed to receive dry material, as well as to stir the fluid contents of the tank. It conditions mud in a minimum of time. Unit may be mounted on the side of steel tank as a permanent fixture or it may be used in earthen pits and placed in position by use of skids. Sack material is fed into the hopper at the upper end of the unit, and is carried through the mixing tube by means of a screw conveyor. A propeller on the lower end of the conveyor shaft, inside of the duct, stirs or agitates the fluid mixture. The diverging ducts as shown may be replaced by a straight duct when the mixer is to be located in the end of a long, narrow tank or pit. Power for the unit is furnished by a 10-hp. steam turbine or an electric motor, as shown. *Texas Iron Works, Inc.*

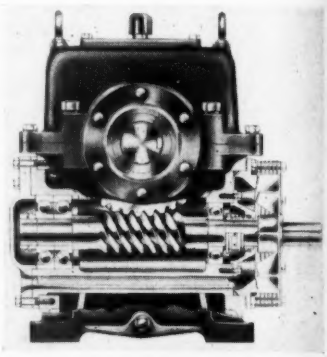
IT'S NEW CHECK IT

(8) INDUCTION MOTOR FOR OIL-WELL PUMPING SERVICE. Three-phase squirrel-cage motor of weatherproof construction is available in ratings of ½ to 15 hp. The motor is of all-steel construction — steel frame, feet, and end brackets resulting in a lighter and more compact motor. For outdoor oil-well pumping, the motor utilizes self-sealed, prelubricated ball bearings that provide effective lubrication for 5 years or longer without repacking. In addition, time-tested Tuffernell insulation with Tufvar wire provides maximum dielectric strength with high flexibility. *Westinghouse Electric Corp.*



IT'S NEW CHECK IT

(9) HYPOWER ENCLOSED WORM-GEAR DRIVES. New line is available in both horizontal and vertical types. Units are smaller in size than conventional drives of equal capacity. They also deliver more power at lower cost, according to manufacturer. High thermal capacity permits the use of smaller, less-expensive reducer, thus providing a saving in original cost. Features include: Increased low carrying capacity; increased thermal capacity; prevention of leakage of oil; reduction in size and weight; improved mechanical capacity. Gear drives are available in a wide range of standard ratios to meet practically any need. *Foote Bros. Gear & Machine Corp.*



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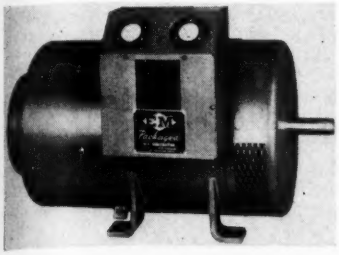
(10) THERMAL-CONDUCTIVITY GAS ANALYZER works on the principle of thermal conductivity gas analysis which measures the rate at which heat is conducted by the gas being sampled. It is mounted in an explosionproof case and is unaffected by voltage variations, ambient temperature, and variations in sample pressure. An all a.c. circuit is employed, permitting the use of this firm's standard electronic-type recorder which does not require dry batteries or standard cell. Analyzer is said to be unusually stable, fast in response, and requires no manual attention or

adjustment except for routine maintenance. *Bailey Meter Co.*

IT'S NEW CHECK IT

(11) "PACKAGED" GENERATOR. Features complete unit of generator, exciter, and built-in voltage-regulating circuit. Includes self-contained main generator switch on ratings up to 15 kw. No additional switches or controls necessary. Unit is connected direct to load. Single and three-phase ratings up to 150 kw. at speeds 900 to 1,800 r.p.m. *Electric Machinery & Manufacturing Co.*



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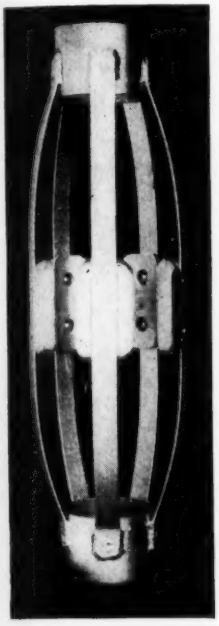


(12) DURAFLEX CASING CENTRALIZER has the following advantages. In the event casing is in key-seat area, key seat is bridged. If casing is pressed hard against hole, a minimum centralization is effected. Scratchers, if used, are thereby allowed to work properly. Due to construction, casing can be moved up or down pulling centralizer into a collapsing position in either direction. If casing is rotated, centralizer remains still as casing rotates inside of centralizer. Additional bearing surface provided by aluminum blocks prevents tearing up of walls of hole as casing goes in. Even when scratchers are used very little shale is torn loose. *The Duraflex Co.*

IT'S NEW CHECK IT

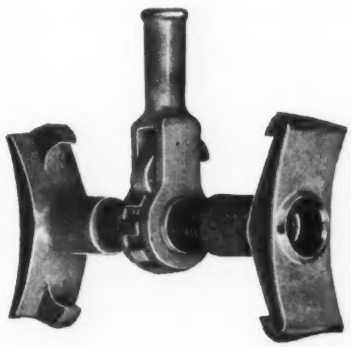
(13) EARTH-SHOCK ACCELERATION DETECTOR. New instrument measures the intensity of explosion shock waves. About the size of a small tin can, it is designed so that it can be buried near the scene of test explosions, enabling engineers to determine the underground velocity and acceleration of shock waves caused. It registers shocks up to 1,500 times the force of gravity, and as many as 10,000 impulses per second. The detector contains crystals which generate a voltage when under stress. Signals are carried through cable to amplifiers and delicate recorders above ground. Detectors are "custom built." *General Electric Co.*

IT'S NEW CHECK IT

(14) CHAIN VISES. Two new chain vises simplify the process of taking roller chain apart. The forged steel jaws securely hold the chain while properly applied blows with an ordinary drift will quickly remove the pin. Each vise has the jaws so shaped that the pin link to be removed has a firm seating on the edges of the jaws. Both vises are easily adjustable to fit chains within their range of sizes. Vise No. 1 will handle single-width roller chains from ½ to 1-in. pitch and double-width roller chains D-40 and D-50. Vise No. 2 will handle single-width chains from 1 to 2-in. pitch and double-width chains from D-80 to D-160. *Baldwin-Duckworth Division of Chain Belt Co.*

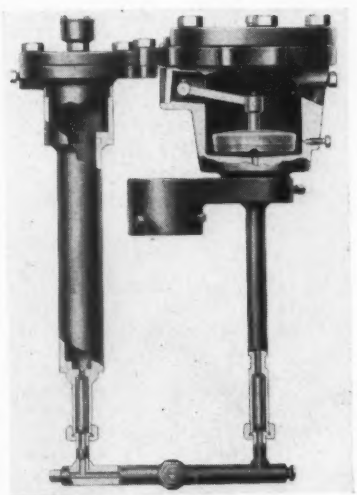
IT'S NEW CHECK IT

(15) SIMPLEX PUSH-&-PULL JACK. Designed for heavy work in the oil fields. Available in two stock models, the jack reduces man-hours on the job and thus increases efficiency. Its new design decreases the weight of the jack for easier portability and faster operation under conditions where ordinary jacks cannot be used. Machine V-edged nut protrusions assure a firm grip for pushing. Lugs offer a firm hold for chain on pulling jobs. The jack cannot slip and always "stays put." Ruggedly built throughout, the jack features screws of precision-cut acme threads. These add greater strength. *Templeton, Kenly & Co.*



IT'S NEW CHECK IT

(16) HIGH-ACCURACY MERCURY MANOMETER. A new type of mercury manometer built to meet requirements of positive actuation, dependable performance, and greater adaptability in flow, liquid level and differential pressure measurement. Available in ranges of 10 to 400-in. of water. It is built for use on indicating, recording, or controlling instruments. Two manometers can be mounted in a single case for recording two flows or ratio flow control. Out-



standing features include: greater energy output; specially designed pressure tight bearing of stainless steel; positive overrange protection; leakless damping adjustment; and interchangeable range chambers. *Taylor Instrument Companies.*

IT'S NEW ✓ CHECK IT

TRADE LITERATURE

(17) SEPARATORS AND EXHAUST HEADS. A 26-page catalog on separators for steam, oil, air, and gas. Includes data such as pressure chart and capacity tables. Catalog designed to help engineers select proper device for each job. *Wright-Austin Co.*

(18) RESISTANCE WELDING ELECTRODES. A 28-page revised edition lists electrodes and accessories available. Includes newly designed water-cooled ejector-type holders with patented features. *Amco Metals, Inc.*

(19) BILT-ON-PUMPS, described in illustrated booklet. Pump design provides 322 combinations for capacities from 10 to 600 g.p.m. *Byron Jackson Co.*

(20) IMPROVED TURBINE-TYPE PUMP. Bulletin describes pump which delivers pressures up to 175 lb. in single stage, at operating speeds of 1,750 r.p.m Delivers capacities to 150 g.p.m. It is inherently a self-priming pump. *Roy E. Roth Co.*

(21) WELDING APPARATUS CATALOG. Colorful, interesting, sales-minded new catalog shows in four-color illustrations comprehensive portion of large line of gas-welding and flame-cutting apparatus. *Victor Equipment Co.*

(22) SILICONE NOTE BOOK. Booklet proveds most comprehensive body of information available on the properties and behavior of the DC 200 Silicone Fluids, notably for heat stability, relatively constant-viscosity over wide temperature range, lubricity and water repellecy. *Dow Corning Corp.*

(23) ROLLER-CHAIN CATALOG. A new eight-page catalog that will prove useful in ordering many sizes of hard-to-get roller chain. Lists prices and specifications. Discusses improvements in design. *Atlas Chain & Manufacturing Co.*

(24) AIROMETRIC CHEMICAL PUMP. Bulletin shows applications for air powered chemical pump. Also capacity-pressure selection table and flow sheets. *Milton Roy Co.*

(25) HIGH VACUUM AND ATMOSPHERIC PROCESSING CATALOG. A 20-page catalog is devoted to higher vacuum and its successful application. Also describes plant and laboratory equipment, and confidential advisory service. *F. J. Stokes Machine Co.*

IT'S NEW ✓ CHECK IT

(26) PRESSURE AND VACUUM GAGES. New catalog has full and complete descriptions of various instruments such as indicating and recording pressure gages, recording flow meter, controllers, etc. Thirty-one pages. *The Brown Instrument Co.*

(27) PROTECTIVE COATINGS. New, four-page bulletin introduces latest developments in line of corrosion-resisting materials. Typical case-histories are presented. *United Chromium, Inc.*

(28) CAPACITY DATA FOR CONCENTRIC ORIFICES AND FLOW NOZZLES. Bulletin presents convenient method for approximating orifice or nozzle throat to pipe diameter required for satisfactory fluid meter installations. Includes specific volume graphs not heretofore published. *Hagan Corp.*

(29) MICROMAX RECORDERS. A 32-page illustrated catalog lists complete line of strip-chart micromax recorders and controllers for measuring a wide variety of process variables. Gives complete specifications in convenient, tabular form. *Leeds & Northrup Co.*

(30) POWER SLUSH PUMP. Bulletin describes and illustrates details of newest and largest slush pump in line. With a rated output of 700 hp., it will discharge 955 g.p.m. at a pressure of 1,260 psi. *National Supply Co.*

(31) DATA BOOK ON SAFETY AND RELIEF VALVES. A 72-page profusely illustrated book including 26 pages of data. Triple capacity tables give water, air and steam capacities. *Farris Engineering Corp.*

(32) HUMDINGER PUMPS. Unique folder has two pockets containing data sheets covering line of self-priming centrifugal pumps. Specifications, capacity charts, and descriptions given on each model. Well illustrated. *Ralph B. Carter Co.*

(33) TWO NEW HARD-FACING ALLOYS. Bulletin describes increased wear resistance, faster deposition, and superior weldability of two new alloys. Gives properties and characteristics and tells what satisfied users say. Also lists distributors. *Stoody Co.*

(34) ERECTION INSTRUCTIONS BOLTED STEEL TANKS. Thirty-six pages describe and illustrate all important details of erection procedure. Begins with preparation of foundations and covers each step to installation of roof sections. Warnings and cautions also given. *Columbian Steel Tank Co.*

(35) HOMES THE MODERN WAY. Ready-cut homes for the oil industry. Sixteen pages illustrate and describe construction of home from the time foundation is staked out, through erection of subfloor, outside walls, partitions, ceiling, roof, to occupacy. *Houston Ready-Cut House Co., Inc.*

(36) LONG-DISTANCE TWO-WAY RADIOPHONE. Six-page fold-out bulletin. Shows how oil-company management can maintain close supervision over widely separated crews through use of radiophone. General specifications given. *Belmont Radio Corp.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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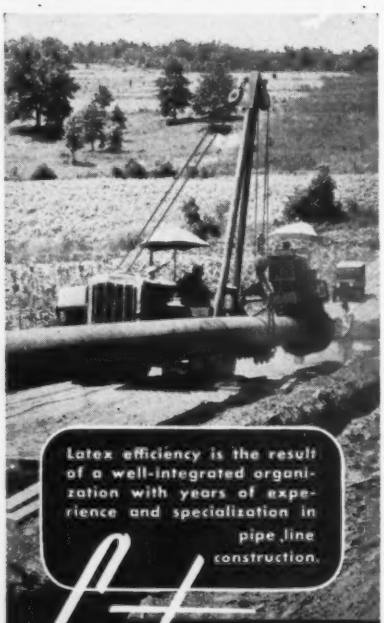
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PIPE LINES

Shell Lets Ozark Station Contracts

SHELL PIPE LINE CORP. awarded contracts last week for station construction, including conduit and duct work, for the Cushing, Okla.-Wood River, Ill., Ozark System. Marshall-Kerr Construction Co., Tulsa, will build stations at Cushing and Chelsea, Okla.; Johnston Construction Co., Springfield, Mo., has contracted for stations at Buffalo, Diamond, Bland, and Springfield, Mo. Contract for a station at Wood River is to be let later.

Pipe for this 435-mile 22-in. crude-oil line for Shell and Texas Pipe Line Co. is being shipped from the Youngstown Sheet & Tube Co. plant, Youngstown, Ohio, on a schedule which calls for the departure of a 60-car trainload of pipe every 36 hours.

An early shipment for the project was made by a 60-car train which left Youngstown December 3 and delivered 45,000 ft. of 22-in. on December 6 at points between St. Louis, Mo., and Cushing, Okla., in such a way that all of the spreads received pipe.

The six contractors' spreads which will push construction along the entire route during winter months are situated as follows: Midwestern Constructors, Inc., M. T. Wilhite, superintendent, Cleveland, Okla.; Smith Contracting Co., Merle Rumsey, superintendent, Vinita, Okla., and Fred Peters, superintendent, Neosho, Mo.; and Anderson Brothers Corp., Lebanon, Warrensville and St. Charles, Mo. The first work to get under way was at the Missouri River crossing. The Missouri and Mississippi River crossings and the intervening section are to be constructed by the Anderson Brothers' spread with present field headquarters at St. Charles, Mo.

Byrd-Frost Discusses Line to San Francisco

A 26-in. natural-gas line from the San Juan Basin to San Francisco, Calif., is a project which the Byrd-Frost, Inc., interests are striving to have built when arrangements may be completed, according to Harold Frost, president of Byrd-Frost, Inc. Contrary to previously published accounts this line would not deliver to Salt Lake City connections.

Arrangements have not yet been made for engineering services for design of the project. The significance of Byrd-Frost exploration activities in the San Juan Basin was discussed in The Oil and Gas Journal, page 137, December 9, 1948, issue.

Sunray Nears Completion Of Velma Gathering Lines

Approximately 25 miles of a crude-oil gathering line system running from the Velma crude-oil pump station of Sunray Oil Corp. in Stephens County, Oklahoma, is nearing completion. The system will enable Sunray to better receive and deliver crude oil to and from oil leases and pipe lines in the Velma area.

Already completed is a 4-in. line from the Velma station northeastward to the Tussey, Okla., pipe-line outlet of Kerr-McGee Oil Industries, Inc., for crude-oil exchange purposes. A 4-in. line running some 6 miles northwest of Velma to connect with the Interstate Oil Pipe Line Co. system has also been completed. This line will make it possible for Sunray to receive high-gravity sweet Chitwood crude for special segregated blending uses at the company's catalytic cracking refinery at Duncan, Okla.

A completed line also runs 3 miles south of Velma to where Sunray is taking several thousand barrels of crude oil daily from producing leases in the Alma, Chitwood, Knox, Doyle, Crude, Velma, Sholem Alechem, and Tussey areas.

Construction is scheduled to begin immediately on a new 4-in. line, 1½ miles long, from Velma to Interstate Pipe Line system's Tussey station where Sunray can deliver to or receive from Mid-Continent Petroleum Corp., Sohio Petroleum Co., Rock Island Oil Co., Inc., Stanolind Oil & Gas Co., and Interstate.

Through exchange facilities at Velma Sunray will be able to deliver to or receive from 23 separate producers in the area. Sunray's Duncan refinery is currently running approximately 18,000 bbl. of crude and charging stock daily.

Michigan-Wisconsin Seeks Additional Facilities

Michigan-Wisconsin Pipe Line Co., Michigan Consolidated Gas Co., and Austin Field Pipe Line Co., all of Detroit, Mich., have filed a joint application seeking Federal Power Commission authority to construct additional

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- GAS PIPELINES
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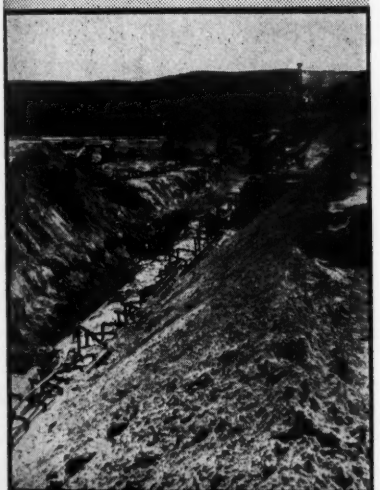

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natural-gas facilities in connection with the Michigan-Wisconsin Co.'s Texas-to-Michigan pipe-line project, which was first authorized in 1946.

The previously authorized facilities include 1,069 miles of 26 and 22-in. pipe extending from Hansford County, Texas, to the Austin Storage Field near Big Rapids, Mich. (For details of the earlier status of the proposed line see The Oil and Gas Journal, October 21, 1948, page 149.)

Through the latest application, Michigan-Wisconsin proposes to increase the capacity of the line by 28,000,000,000 cu. ft. of gas per year with installation of additional compressor units to increase compressor horsepower from 15,600 to 48,000.

Michigan-Wisconsin proposes to operate the Michigan Storage Fields and related facilities under a lease agreement with Michigan Consolidated. Michigan Consolidated proposes to construct and operate certain minor facilities and to operate under lease the facilities now owned by and proposed to be constructed by the Austin company.

Michigan-Wisconsin estimates total over-all cost of the project as now proposed at $88,000,000. Cost of facilities to be constructed by Michigan Consolidated and the Austin company are $400,000 and $3,000,000 respectively.

Interventions Permitted In Piedmont's Application

The Federal Power Commission has permitted the cities of Durham and Raleigh, N. C., and 24 other petitioners to intervene in the proceedings involving Piedmont Natural Gas Corp.'s application to construct and operate a natural-gas pipe-line system extending from gas fields in Texas and Louisiana through Mississippi, Alabama, Georgia, and South Carolina and terminating in the vicinity of Danville, Va.

In addition to Durham and Raleigh, petitioners authorized to intervene include 10 communities in North Carolina, seven in South Carolina, and one in Virginia; the Railway Labor Executive Association, Fuels Research Council, Inc., Brotherhood of Locomotive Engineers, National Coal Association, and United Mine Workers of America; Chesapeake & Ohio Railway Co. and Atlanta & West Point Railroad Co., and others.

Texas Eastern Authorized To Deliver Texas Gas

Temporary authorization given Texas Eastern Transmission Corp. for construction of additional facilities on the Big Inch line has been further modified by Federal Power Commission, by letting the company, pending further orders in the proceeding, deliver and sell to Texas Gas Transmis-

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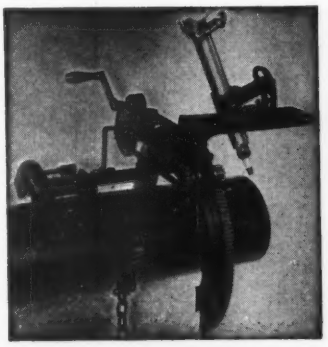

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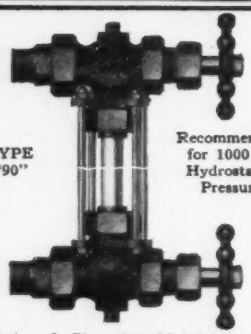

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PIPE LINE SURVEYS

sion Corp. any quantities of natural gas which may be available in excess of the volumes which can physically be delivered by Texas Eastern to its own customers.

Under the modified authorization, gas would be delivered to Texas Gas' Kentucky division for sale to customers in Kentucky and Indiana. Texas Eastern had previously been given FPC authority to deliver gas to the Consolidated companies, East Ohio Gas Co., New York State Natural Gas Corp., and Peoples Natural Gas Co. However, an explosion on November 19 put the company's pumping station near Seymour, Ind., out of operation and Texas Eastern advised FPC that it cannot make deliveries to the Consolidated companies. The company then asked and was granted modification to deliver to Texas Gas Transmission until the pumping station is reconstructed.

Southern Natural Gets Approval for Loop Lines

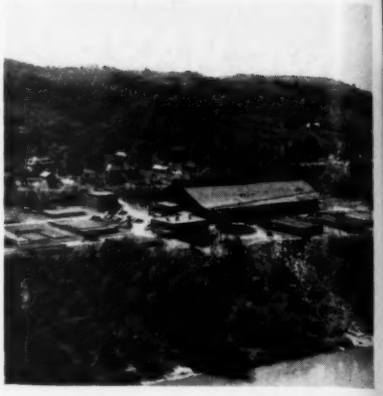
Southern Natural Gas Co., Birmingham, Ala., has been authorized by the Federal Power Commission to construct additional main and branch loop lines in Alabama for transportation of natural gas. Cost of the project is estimated at $865,160.

Facilities will include approximately 8½ miles of 24-in. main line loops, 9 miles of 12-in. branch line loop pipe, and a three line 12-in. crossing of the Coosa River. The main line loops will increase the capacity of the company's system between Birmingham, Ala., and Atlanta, Ga. The proposed branch looping line will increase the delivery capacity of the company's Montgomery branch line by approximately 3,500,000 cu. ft. per day.

Texas-California Line Will Utilize Waste Gas

Paul Kayser, president of El Paso Natural Gas Co. and the newly formed San Juan Pipe Line Co., told the Federal Power Commission last week that the proposed natural-gas pipe line from Texas and New Mexico to northern California would provide a market for gas which otherwise would be wasted. He explained that more than 80 per cent of the gas would come from oil wells.

FPC is currently conducting a hearing on the application filed by El Paso Natural Gas Co., San Juan Pipe Line Co., and Pacific Gas & Electric Co. for authority to build a total of 1,484 miles of pipe line at a cost of nearly $146,000,000 to carry gas from the Texas-New Mexico area into the San Francisco Bay area. *(For details of proposed construction by the companies concerned, see The Oil and Gas Journal, November 25, 1948, page 135).*



In the Pittsburgh Area

Headquarters for Dependable Pipe Protection

To provide a complete pipe protection service in the Pittsburgh area, Pipe Line Service Corporation offers the facilities of its Glenwillard, Pennsylvania, plant.

Covering nine and one-half acres along the Ohio river, this plant is devoted exclusively to the application of pipe protection, offering pipe cleaning, priming, coating and wrapping. Convenient to the tube mills, it is located on the Pittsburgh and Lake Erie Railroad and has ample switchtrack facilities for handling bare and protected pipe.

The Glenwillard plant is just one of six serving pipe users on gathering, transmission and distribution lines.

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NATURAL GAS

A. S. M. E. Told of Bright Future for Natural Gas

Natural gas will be available within 2 or 3 years, in practically all the country's large industrial centers, Paul R. Taylor, vice president of Stone & Webster Service Corp., predicts.

Addressing the 6-day annual meeting of the American Society of Mechanical Engineers in New York City, he pointed out that natural gas can be purchased for industrial purposes for considerably less than solid and liquid fuels.

A.S.M.E. president elect, James M. Todd, urged the delegation to place young engineers on an equal status with older members of their profession in both industry and technical societies.

W. C. Schroeder, Bureau of Mines, proposed to the meeting that three or more commercial-size synthetic-fuel plants be built and operated by private industry, with financial assistance provided by the Reconstruction Finance Corp. if necessary. Both coal and oil shale, Schroeder said, should be used as raw materials. "Anticipated military requirements for any future war," he said, "seem almost astronomical. Traditional wildcatting and geophysical exploration, which have met the need in the past, no longer provide the assurance that demands of the future will be met. Synthetic oil from coal and oil shale offers an assured supply for hundreds of years within the borders of the United States."

Underground Gas Storage Increasing in Illinois

During 1947-48, Public Service Co. of Northern Illinois increased its underground storage in service to more than 95,000,000 cu. ft., all at 2,240 lb. pressure.

Just 2 years ago the company completed its first installation of underground storage of natural gas in buried pipe near Kankakee, Ill. In addition to the Kankakee storage, the company now has 74,000,000 cu. ft. capacity installed near Mt. Prospect, Ill., and 20,000,000 cu. ft. near Matteson, Ill. Another 46,000,000 cu. ft. is expected to be added during 1949 at the Mt. Pleasant site.

By the end of 1949 the present capacity in service will be increased to more than 141,000,000 cu. ft. An additional 30,000,000 cu. ft. of underground storage is either in service or under construction by other companies, mostly in the Chicago area.

Three Michigan Cities Ask FPC Order for Natural Gas

A petition has been filed with the Federal Power Commission by three Michigan cities, Port Huron, Marysville, and St. Clair, asking the commission to direct Panhandle Eastern Pipe Line Co. to connect its facilities to the facilities of Detroit Edison Co. for the purpose of furnishing Detroit Edison an adequate supply of natural gas for service to the three municipalities and adjacent territory now served with manufactured gas.

The communities stated in their petition that theirs is the only territory in the southern part of the lower peninsula not now served with natural gas and that they are discriminated against when 93.6 per cent of the gas users of lower Michigan are supplied with natural gas while they must not only pay prohibitive rates but suffer shortages and curtailment of their manufactured-gas supply.

Cost to consumers in the area averages 17.74 cents per therm for manufactured gas while adjacent communities now receiving Panhandle gas obtain it at an average cost of 7.84 cents per therm, the petition said.

Natural-Gas Utilities Sales Continue to Climb

October sales of natural gas by utilities to ultimate consumers totaled 2,128,632,000 therms, an increase of 12.2 per cent over October 1947. Because of changeovers from manufactured gas to natural-gas distribution by several important companies during the year, sales of manufactured gas in October were 165,546,000 therms, 0.1 per cent under October a year ago.

For the 12 months ended October 31, 1948, natural-gas sales amounted to 28,023,887,000 therms, up 12.1 per cent over the preceding 12 months. Manufactured gas sales were 2,515,267,000 therms during the year ended October 31, 1948, an increase of 3.8 per cent over the like period in 1947.

Figures in the mixed gas branch of the industry more seriously reflect the effects of changeovers to natural gas by major companies and in this category, sales in October 1948 totaled 84,268,000 therms, a decline of 5.5 per cent under October 1947 sales. For the 12 months ended October 31, 1948, mixed gas sales totaled 1,212,140,000 therms, 17.1 per cent under the comparable period a year earlier.

Texas Eastern Transmission Rates Hearing Postponed

A hearing scheduled to commence December 13 concerning supplemental rate schedules proposed by Texas Eastern Transmission Corp. to increase rates and charges on sales of natural gas by application of tax adjustment clauses reflecting a new Louisiana tax, has been postponed until March 14, 1949. Postponement was made at the request of the company.

Texas Eastern's proposed schedules previously were suspended by FPC until January 13, 1949. However, the company has agreed that if the new postponement is granted it will not move to put the schedules into effect prior to final determination in the proceeding by the commission.

Kentucky-West Virginia Granted Rates Rehearing

A limited rehearing on February 14, 1949, has been granted by Federal Power Commission on its order of October 8, 1948, directing Kentucky-West Virginia Gas Co. to reduce its interstate wholesale rates to Louisville Gas & Electric Co. and Pittsburgh & West Virginia Gas Co. in the aggregate amount of $571,284 based on annual operating revenues for the year 1945.

The rehearing will be limited to the company's allegation that certain of its 1948 experience is enough to show that the test year of 1945 is inappropriate for the future and that its experience for 1948 "is a far better and more accurate basis for determination of cost of service."

The company has submitted data to the commission in its petition for rehearing, indicating that the rate reduction would be not less than $376,515 instead of $571,284 ordered by the commission.

Pending a decision on rehearing the commission ordered that the $571,284 rate reduction order is to remain in effect except that the rate schedules to be filed and observed may provide for the collection of rates which will produce the disrupted difference in annual revenue. This additional revenue is to be earmarked and retained in segregated reserve. If, and to the extent the rate reduction is reaffirmed, the segregated reserve is to be refunded in whole or in part depending on the rate reduction ultimately made.

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Rated capacity for example. Can its permanence be taken for granted regardless of field adjustments? CONSOLIDATED capacity is not dependent upon multiple and adjustable rings. Secondary orifice dimensions, which affect capacity, are fixed in the design and cannot be accidently altered during maintenance or for any other reason.

How about *leakage* due to distortion under discharge piping stresses? The exclusive CONSOLIDATED outside bevel seat and floating guide construction introduces "flexibility" of seat contact under all conditions of operation.

Tight valves, unalterable capacity, 25% fewer parts, maximum interchangeability—a CONSOLIDATED specification assures "more than meets the eye" when you are buying pressure vessel protection.

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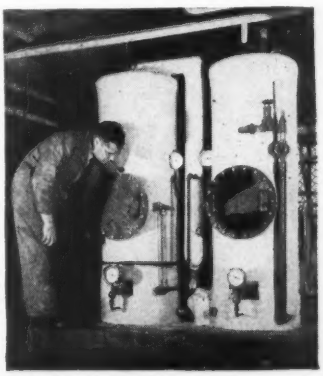
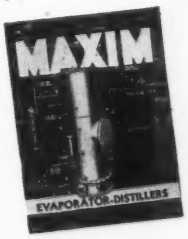
Any evaporator can produce fresh water, but what you want is efficiency. Scaling, the big headache, is reduced to a minimum in Maxim Evaporators because of their very high circulation rate. When descaling is necessary a unique design feature allows quick and easy descaling, cutting down time by hours.

Maxim Evaporators are extremely compact . . . automatic in operation, and produce fresh water to a purity of 2/10 grains of solid per gallon, or 3½ parts per million. They are available in single or double effect. The two evaporators shown produced on test 2500 gals. per day and higher capacities are possible. Investigate these very efficient evaporator units.





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REFINING

Gulf Completes Expansion Program at Port Arthur

COMPLETION of a $19,000,000 expansion program at its Port Arthur, Tex., refinery, has been announced by Gulf Oil Corp. New construction includes a desulfurization unit, a polyform unit, three atmospheric-vacuum topping stills, and an extension of docking facilities.

A potential increase of 66,000 bbl. daily to the refinery's crude charging capacity is made possible through the installation of the units, company officials said. At present the desulfurization and polyform units will be operated in conjunction to produce a higher quality of gasoline from straight-run gasoline, naphtha fractions and light hydrocarbons.

The three new atmospheric-vacuum stills will separate the crude oil into the necessary processing fractions, two of them replacing older shell stills. The third still will possibly be used to add to charging capacity.

Docking facilities have been expanded by the extension of the present 25-ft. wide wharf to a width of 50 ft. for the entire dock length of 3,000 ft. The additional width extends the wharf into a recently dredged, deeper channel and permits the simultaneous berthing of six of the largest modern tankers, up to 525 ft. in length, for loading and unloading at the wharf.

Conoco's Billings, Mont., Plant Is Half Completed

Construction of Continental Oil Co.'s $9,500,000 refinery at Billings, Mont., to be the company's largest and northernmost plant in the Rocky Mountain states, has passed the halfway mark. Completion of the 7,500-bbl. daily refinery is expected in October or November 1949, according to H. G. Osborn, vice president in charge of manufacturing.

Materials shortages thus far have not disrupted the timetable on the project which at present employs a crew of 278 men. Units completed or near completion include tank-car loading rack, truck loading rack, shop and warehouse, office building, cooling tower, oil trap, roadways, two crude tanks with capacity of 120,000 bbl. each, railway sidings, marketing warehouse, and Ethyl plant.

The new refinery will include the modern processes of catalytic cracking, catalytic desulfurization and polymerization and solvent extraction of asphalt. The plant will manufacture a high-octane gasoline and a full line of burning fuels and residual oils. The supply of crude oil will come to the Billings refinery from Continental's Frannie and Elk Basin fields lying in Montana and Wyoming and the South Elk Basin field in Wyoming. The new plant will include a tank farm having a storage capacity of 700,000 bbl. of crude and refined oils.

A trailer camp was recently established at the refinery site to facilitate housing for many of the workers.

Synthetic Resins Plant To Be Built at Houston

HOUSTON.—Another large chemical plant for the rapidly expanding Gulf Coast area has been announced by Reichhold Chemicals, Inc., of Detroit.

Reichhold will build a $500,000 plant in the Houston area to manufacture synthetic resins. Products of the plant will be used in the oil industry, for surface coatings such as paints and varnishes, and for acid-resisting cement. Synthetic resins are widely used in the oil industry for corrosion protection and for resistant coatings to guarantee purity of product.

In announcing the plant, Henry H. Reichhold, chairman of the board, said, "We will use styrene from Monsanto Chemical Co. at Texas City, synthetic glycerin and other products from Shell Chemical Co., and will be a customer of Rohm & Haas, which is just completing a big chemical plant here."

Shell's synthetic glycerin plant, which is one of the suppliers, uses petroleum refining waste gases as a basis for its glycerin manufacture.

Reichhold has domestic plants at Detroit, Brooklyn, Elizabeth, N. J., Seattle, Tuscaloosa, Ala., and San Francisco. In addition, it has foreign plants in Argentina, Australia, England, France, Italy, and Switzerland.

Gulf Increases Refining Capacity for Kuwait Oil

A $40,000,000 expansion program to provide added facilities for processing

Kuwait crude at its Philadelphia refinery was announced last week by Gulf Oil Corp. Included in the program will be 30,000 bbl. of additional crude distillation capacity and docking facilities for five 28,000-ton tankers of the type now building for Gulf. The 360-acre site of the plant will be doubled by purchase of land in southwest Philadelphia.

The program will increase the refinery's rated crude capacity to 104,700 bbl. daily, ranking it fourth largest on the East Coast. Eventual expenditure at the plant may exceed $100,000, it was reported.

American Gilsonite Begins Utah Plant Construction

American Gilsonite Co., owned jointly by Barber Oil Corp., New York, and Standard Oil Co. of California, has begun preliminary construction on a plant at Bonanza, Utah, which will dissolve eastern Utah gilsonite in crude oil from the Rangely, Colo., oil field.

The plant, which will cost from $200,000 to $300,000, will permit delivery of the gilsonite in soluble form through the new 182-mile pipe line from Rangely to the Salt Lake City Refining Co. refinery, according to E. F. Goodner, executive vice president of American Gilsonite.

The proposed plant described as "an oversized pilot plant," will utilize gilsonite for fuel oil, gasoline, and similar products. The soluble gilsonite will be similar to very thick crude oil, Goodner reported.

The new method of dissolving and proportioning the gilsonite is the result of a long research program by California Research Corp., at Richmond, Calif., Goodner said. The plant output, depending on carrying capacity of the pipe line and outlets for the Salt Lake Refining Co.'s product, will be equivalent to 100 to 600 bbl. of crude oil daily.

War-Restricted Papers Published by A. P. I.

War-restricted papers on "Newer Physical Methods of Analyses," presented at a symposium May 12, 1944, by the Technical Advisory Committee of the Petroleum War Council, have been published by the American Petroleum Institute.

Papers presented at the symposium include the following: "Freezing Point Measurements, Adsorption, and Refractometry, and Their Application to Analysis in the Petroleum Industry," F. D. Rossini; "Analytical Distillation and Its Application to the Petroleum Industry," Walter J. Podbielniak; "Raman Spectra and Their Application to Analysis in the Petroleum Industry," E. J. Rosenbaum; "Ultraviolet Absorption and Its Application to Analysis in the Petroleum Industry," S. C. Fulton; "Infrared Absorption and Its Application to Analysis in the Petroleum Industry," R. Robert Brattain; "The Mass-Spectrometer Analytical Method and Its Application to the Petroleum Industry," H. W. Washburn, H. F. Wiley, S. M. Rock, and C. E. Barry; and "Applicability of Newer Physical Methods for Hydrocarbon Analysis," W. J. Sweeney.

The symposium reflected the state of development of the techniques and tools described at the time the papers were presented. The publication is priced at $3.50 per copy. One thousand copies are available. Orders should be addressed to J. A. McNally, American Petroleum Institute, 50 West 50th Street, New York 20, N. Y.

Frontier Refining Adds New Storage Tanks

Two 10,000-bbl. and one 15,000-bbl. storage tanks were recently completed at the Cheyenne tank farm of Frontier Refining Co. and will be used for asphalt production, thus securing more uniform and efficient operation of the asphalt unit, according to Harry A. Brown, refinery superintendent.

The new storage increases the number of tanks at Plant No. 1 to 60 with total capacity of 389,200 bbl., and the number of tanks at Plant No. 2 to 49 with total capacity of 344,000 bbl. Tanks range in size from 500 to 65,000 bbl.

Frontier recently placed in operation a new Unisol treating plant at its Cheyenne refinery. J. H. McCoullough, of Philadelphia, Pa., and representing Atlantic Refining Co., which developed the Unisol process, was present when the new Frontier unit was placed in operation.

Non-Flammable Hydraulic Fluid Is Announced

Standard Oil Co. of California has announced the marketing of a new hydraulic fluid for use in aircraft. Said to be the first completely nonflammable product of its type, it will not ignite when subjected to a 5,000 degree flame, and in fact may find additional use in fire extinguishers on planes.

The new fluid is a petroleum derivative. It will find use in very high pressure hydraulic systems for operation of landing-gear mechanism, flight control surfaces and cabin superchargers, where it will eliminate a serious fire hazard. To be known as "RPM" Non-Flammable Hydraulic Fluid" the new product is a result of more than 2 years' development by California Research Corp.

Well known company having excellent organization throughout Western Europe and Scandinavian countries require sole agency of American refineries for the following products:

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Opelousas, La. [redacted]

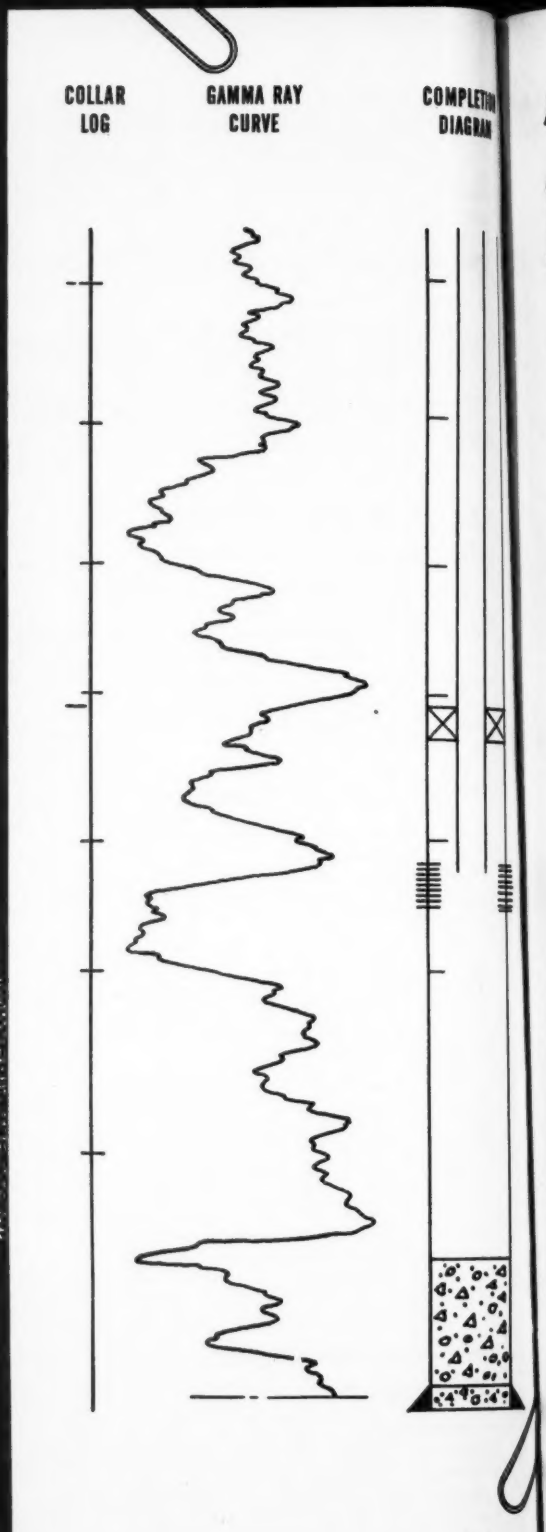
Report on [redacted]

This well had been drilled to contract depth. We were called in because seven electrical surveys did not check with other well measurements.

Ran Gamma Ray and Collar Log Survey to tie down formations to bench marks. Log showed 17-foot measure discrepancy in electrical surveys. Well was gun-perforated accurately from collars, with 72 holes. Completed for an I. P. 210 BOPD, 46.3° gravity, through 1/8" choke.

Operator says, "Without this Log, we would have had a dry hole." Says he is sold on Lane-Wells Radioactivity Well Log from here on.

Signed [redacted]



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Among the

Drilling Contractors

Number of Active Rotary Rigs Shows Decrease

A slight decrease in the number of active rotary rigs in the United States and Canada marked the last week in November. Figures released by the Interstate Oil Compact Commission also show a drop from the corresponding time in October.

The total number of active rigs has been maintained above the 2,400 mark as is shown by following figures:

	Oct.	Nov.
Pacific Coast	200	192
Oklahoma	292	283
Kansas	139	139
Rocky Mountains (incl. W. Canada)	240	239
N. La., E. Tex., and Ark.	176	186
West Texas and New Mex.	603	603
Gulf Coast	604	624
Illinois	168	140
Total	2,422	2,406

Olson Drilling Co. is rigging up rotary tools at its 1 Manire, SW SW NE 6-2s-3w, in Carter County, Oklahoma.

Lewis Drilling Co. and Dozier 2 Purcell in SE NW NW 33-19s-9w, in Rice County, Kansas, have set surface pipe. Lewis Drilling 1 Knopp in NE SE NE 32-19s-11w, in Barton County, Kansas, was reported dry and abandoned in Arbuckle at 3,417-18 ft.

Bennett Drilling Co. is starting a 3,250-ft. test at 1 Harper, SW SE SW of 17-14n-16e, Lincoln County, Oklahoma.

McClure Drilling Co. has contract to drill Carter Oil Co. 1 Jack Lauber, SW SE SE of 6-16n-17w, in Oceana County, Michigan.

Mouser Drilling Co. has set 316 ft. of 8-in. surface pipe in 1 Fransen, NW SE NW 6-20-12, Barton County, Kansas.

Kemp Drilling Co. 2 Ogden in Lot 116, 42-6n-2w, south offset to the La-Grange field discovery well in Adams County, Illinois, has been completed for 223 bbl. of oil daily.

Suntex Drilling Co. and Blackwell Oil & Gas Co. have announced location for 1 McVay, SE SE NW of 24-19n-3e, about ½ mile southwest of the Southwest Council Creek pool in Payne County, Kansas.

Brunson Drilling Co. has rigged up standard tools to test 1 Schmeidler, in NW NW NW 27-12-17w, ½ mile north of the east edge of the Schmeidler pool in Ellis County, Kansas.

Pictured here is a crew of Producers Drilling & Servicing Co. at the Skelly 3 Hanson near Velma, Okla.—W. E. Brown, Roy Shehorne, driller, Woodie Hensley, and T. W. Watson

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Oil Tools

Total depth of the semiwildcat was 3,669 ft.

Zephyr Drilling Co. et al 1 Weiss is staked in SW SW SE of 3-16n-3w, Logan County, Oklahoma, and is scheduled for an early start to drill 6,200 ft.

Peel Drilling Co. has started the Derby Oil Co. and Peel 1 Lewis in NE NE NW 23-10s-21w, in Graham County, Kansas.

Turner Drilling Co. will drill Pure Oil Co. 4 H. H. Joseph, C W½ SW SE of 7-25n-4w, in Crawford County, Michigan.

Sterling Drilling Co. has contract for Alpine Oil & Royalty Co. 1 Johnson, NE NE NE 28-20-8, 3 miles southeast of the Lyons pool in Rice County, Kansas.

Kingery Brothers Drilling Co. is starting a 2,200-ft. test, 1 Carter Bonner, in NW SW NW 21-3s-4w, in Jefferson County, Oklahoma.

Guy Maybee Drilling Co. has staked location and is moving in rotary tools to drill 1 Lulu Kone Colbert, 1,980 ft. from north and 660 ft. from east lines of Section 41, Block 42, T-2-S, T&P Survey..

Williams-Copeland Drilling Co. has contract for Clark C. Nye 1 Craddock in SW SW SW 14-23n-5e, for a 3,100-ft. test south of Ralston in Pawnee County, Oklahoma.

Ashby Drilling Co. has completed its 2 McNulty-Clay Comm., SE NW SW 28-1s-16w, Geneva Township, Van Buren County, Michigan. The well was rated good for 25 bbl. per day.

Peel Drilling Co. will drill Derby Oil Co. 1 Grizzell, SE SW NW 11-18-11, in the Ames pool of eastern Barton County, Kansas.

Hannum Drilling Co. and Aladdin Petroleum Corp. were preparing to take a second drill-stem test in the Lansing-Kansas City at 1 Brodie, SW SW SE 23-19-12, in Rice County, Kansas, after recovering 1,140 ft. of gassy oil and mud from the top of the formation.

Voorhees Drilling Co. has contract to drill Ervin Major & Fred Riddell 3 Clare & Sarah Baldwin, SW SW NW 28-10n-7e, in Tuscola County, Michigan, in the Arebela pool.

Can-Tex Drilling Co. will move rig to drill California Standard's new wildcat, the Dunmore-Province 44-20-10-5, LSD 7, 20-10-5w4, a gas test scheduled as an attempt to extend Standard's gas discovery area located about 6 miles to the northeast of the new location.

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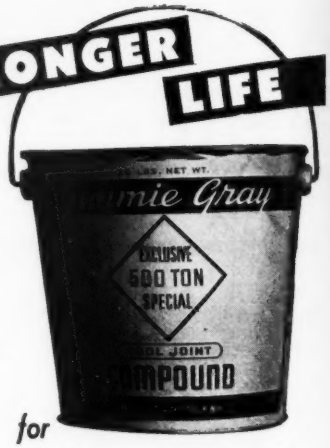

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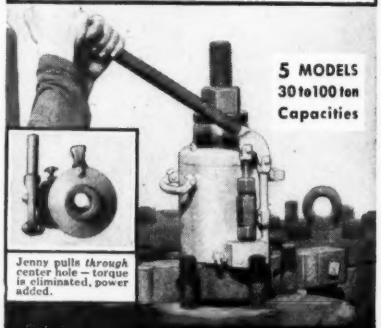

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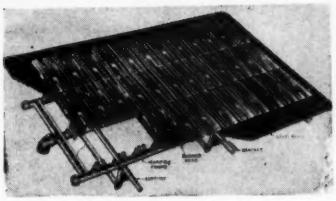

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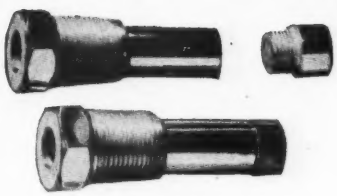

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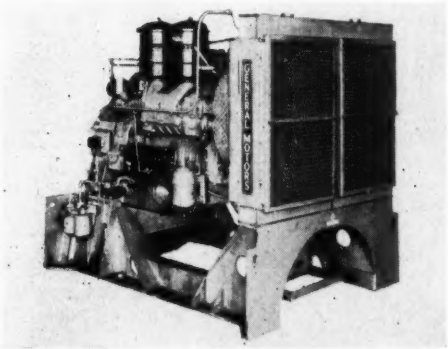

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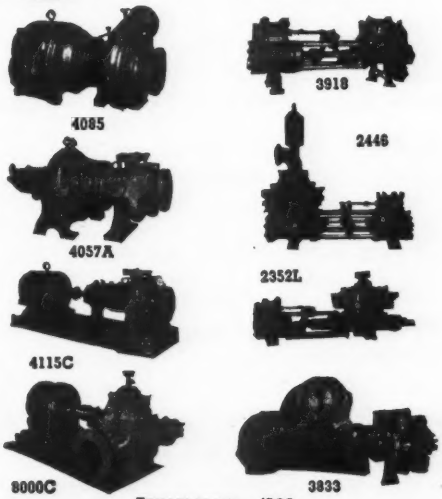

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Exploration and Drilling

Two Southern Alberta Tests Look Interesting

THE attention of Canadian operators has been diverted, temporarily, at least, from the northern part of Alberta to the territory around Hanna, about 90 miles northeast of Calgary, by the drill-stem-test results from two wells.

Socony-Vacuum Oil Co., Inc., 1 Craigmyle, LSD 12, 32-32-1w4, recovered about 1,100 ft. of 34°-gravity crude, on a drill-stem test in the Madison lime (Mississippian) at somewhere around 4,050 ft. Interval of test was not available, and at last reports the well was coring below 5,000 ft. It is understood that it will be carried on down to test the Devonian, per original schedule.

Hanna Petroleums, Ltd., 3 Hanna Pete, LSD 14, 5-33-14w4th, about 16 miles southeast of the Socony-Vacuum test, and presumably on a different structure, recovered about 1,700 ft. of 32°-gravity crude from the Sunburst sand on a drill-stem test from 3,704-14 ft. This well will probably go on down to the Madison, its original objective.

Only a few weeks ago Hanna Petroleums completed 1 Dowling, LSD 8, 5-32-15w4, as a wet-gas well in the same Sunburst sand. The Dowling test is about halfway between the Socony Craigmyle and 3 Hanna Pete. But the No. 3 Hanna Pete was started because 1 mile east, Berry Creek Petroleums No. 1 was completed in the spring of 1947 as a wet-gas discovery in the top of the Madison. The idea was to drill 3 Hanna Pete downdip to see if the Madison carried oil on the flank of the structure.

In Alberta the Madison thins and pinches out coming east from the foothills belt. It also thins and pinches out going north. From south to north, the Madison is present from the border northward to a point somewhere south of Leduc, Wainwright, and Lloydminster fields, where it pinches out, leaving the Cretaceous lying directly on top of the Devonian. Between Princess field to the south and Wainwright to the north, about 650 ft. of Madison disappears. These wells are in between.

Therefore, while nothing like the thickness of Madison present in Turner Valley is to be expected, the Craigmyle-Hanna wells are in an area where a fair section of Madison could be present. The local structure on which they are presumed to be located, are probably associated with the Sweet Grass arch, a regional feature which extends from Montana northward at least this far. The top of the Madison will be an unconformity, with a good chance for weathering porosity, and possibly development of a cherty zone. When considering the deeper Devonian possibilities, the probable unconformity at the top of the Devonian should create a favorable environment for porosity development.

Geographically, the new area can be considered a long stepout north from the string of small fields that are a northward continuation of the Montana border fields. These new tests are about halfway between Princess, the northernmost field of the border extension, and Wainright. Wainright is the southernmost field of a cluster of Cretaceous sand producing fields east of Edmonton, along the Alberta-Saskatchewan border.

Further development around the Hanna area may also throw some light on other geological problems about oil accumulation in this part of Canada. For instance, does the absence of Madison have any bearing on the fact that Cretaceous sand production is apt to be low gravity oil, if none of the lower formations produce oil? Or, do complete data show that Cretaceous sand production is not always higher gravity, when found above Devonian production? Is there some critical thickness of Madison that has a bearing on either production, or gravity, in overlying Cretaceous sands in the southern part of Alberta?

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—Additional discovery of oil from the Pennsylvanian for Scurry County was indicated at Placid Oil Co. 1 Davis, north and east of Snyder. Although testing had not been completed on all zones, it apparently was dry in the Reef limestone, but flowed oil on a drill-stem test of the Strawn, below the Reef.

SOUTHEAST NEW MEXICO.—A 98-bbl. flow of oil on a 1-hour drill-stem test has assured Lea County of a new Simpson field. Continental Oil Co. 1-B-29 Warren, 29-20s-38e, made the test from 8,961-9,055 ft. Location is 1 mile east of shallow production, 7 miles north of Eunice and 3 miles east of the Skaggs area.

NORTH TEXAS.—The Eanes field, southwest of Bowie in Montague County, received prospects of further expansion when Star Oil Co. brought in the second well, located northeast of Sinclair's 1942 discovery well.

ROCKY MOUNTAIN AREA.—On a 24-hour test Pure Oil Co.'s West Poison Spider, Wyoming, Mesa Verde discovery flowed 2,150 bbl. of 45°-gravity oil through 1-in. choke.

SOUTHWEST TEXAS.—Two wildcat wells are opening new oil fields in Atascosa County. Kirkwood & Morgan & Placid Oil Co. 1 Louis Eisenhauer, 10 miles north of Charlotte, is flowing oil with 300 psi. tubing pressure and 450 psi. casing pressure on ¼-in. choke, from open hole at 5,143-80 ft. McFarland Drilling Co. 2 Henrietta Krisch et al, 3 miles north of Poteet, is swabbing heavy mud out of hole at approximately 1,300 ft., swabbing in from open hole at 3,573-3,612 ft.

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SOUTH LOUISIANA

New Producing Field in Jefferson Davis Parish

NEW ORLEANS. — A new oil-producing pool has been opened in Jefferson Davis Parish, approximately 1 mile southwest of West Tepetate production. W. T. Burton 1 Anna Byam Keith, the discovery well, in Section 3-8s-3w, was drilled to a total depth of 9,646 ft., with oil pay topped at 8,392 ft. On potential gage the well flowed 257 bbl. of 35.5°-gravity oil per day through a 10/64-in. choke, with flowing pressure on tubing at 1,100 psi. Gas-oil ratio was 400. Production is through perforations at 8,392-8,406 ft. A deeper sand was tested through perforations at 8,422-8,424 ft., which flowed 209 bbl. of oil per day with flowing pressure on tubing at 1,050 psi., but this section was squeezed when salt water channeled in.

Stanolind Oil & Gas Co. 9 South Jennings Unit, 11-10s-3w, has been completed as a new gas-condensate producer on the north side of production in Jefferson Davis Parish, South Jennings field. Total depth is 11,275 ft., with liner cemented to 11,268 ft. On potential gage the well flowed 60 bbl. of 52°-gravity condensate per day with 2,300,000 cu. ft. of gas per day, through a 16/64-in. choke. Flowing pressure on tubing was 440 psi., casing pressure 1,600 psi. Gas-condensate ratio was 38,500. Production is through perforations at 9,636-46 ft. Deep tests below 10,200 ft. proved nonproductive.

New oil production has been opened on the east flank of the Iowa dome in Calcasieu Parish by Magnolia Petroleum Co. 1 E. L. Scott, in Section 18-9s-6w, in Jefferson Davis side of the field. Total depth is 11,498 ft., in salt, which was topped at 8,975 ft. A cement plug was placed from 8,750 to 8,995 ft., and pipe was cemented to 8,995 ft. The well was completed through perforations at 8,708-12 ft., flowing at the rate of 130 bbl. of 38°-gravity oil plus 422 bbl. of salt water per day, through a 1-in. choke. Gas-oil ratio was 2,444. Flowing pressure on tubing was 150 psi., casing 1,000 psi.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Beauregard Parish: New oil pool, West Bivens—Atlantic Refg. Co. 1 Kirby Lbr. Co., 17-5s-13w, 4½ mi. E of Tex-La state line and approx. 3½ mi. W of Bivens production, TD 9,806 ft., top sand 9,328 ft., Wilcox, perf. 9,328-34 ft., comp. 11-25-48, IP: 195 bbl. oil per day through 8/64-in. choke, GOR 311, TP 1,050 psi., CP 1,080 psi., grav. 39°.

Jefferson Davis Parish: New oil discovery W. T. Barton 1 Anna Byam Keith, 3-8s-3w, 1 mi. SW of West Tepetate production, TD 9,646 ft., top sand 8,392 ft., perf. 8,392-8,406 ft., IP: 257 bbl. oil per day through 10/64-in. ch., GOR 400, TP 1,100 psi., grav. 35.5°, comp. 11-16-48.

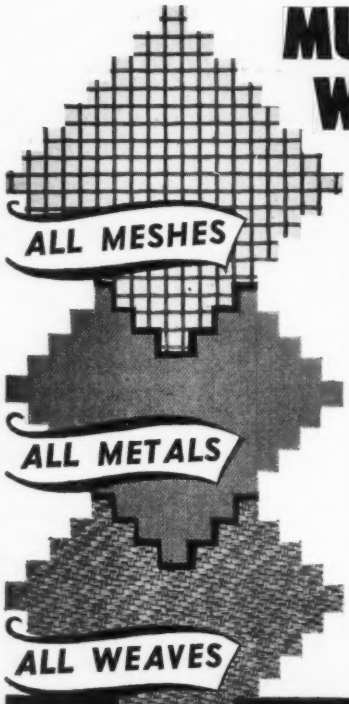
St. Landry Parish: New gas-condensate pool Melville—Sun Oil Co. 1 Swift, 23-4s-7e, 2½ mi. SW of Mellville townsite and 10 mi. N of Krotz Springs production, TD 12,500 ft., top sand 11,240 ft., perf. 11,240-245 ft., IP: 190 bbl. condensate per day and 2,148,000 cu. ft. gas per day through 12/64-in. choke, TP 3,125 psi., CP 1,000 psi., grav. 54.8°, comp. 11-18-48.

SOUTH LOUISIANA WILDCAT FAILURES

Beauregard Parish: O'Meara Brothers 1 W. E. Walker, 14-5s-7w, approx. 6 mi. E of Hurricane Creek production, dry, TD 9,001 ft.

Jefferson Davis Parish: William Helis 1 La. State Rice Milling, 41-9s-3w, 2½ mi. E of Roanoke, dry, TD 10,266 ft.

Plaquemines Parish: Shell Oil Co., Inc., 1 State-Grand Bay, Lease 1270, West



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Grand Bay wildcat, 4 mi. NW of Grand Bay production, dry, TD 12,163 ft.

St. Mary Parish: Magnolia Pet. Co. 2-62 Eugene Island Block state lease 676, Eugene Island area, dry, TD 2,829 ft. Top salt 2,815 ft., hit cavity at 2,805 ft.

Terrebonne Parish: Cities Service Oil Co. 1 Sugars, 41-16s-16e, 5 mi. NE of Gibson, dry, TD 11,817 ft.

Hunt Oil Co. 1 LLE & Co., in Township 22s-15e, 3 mi. S of Dog Lake field production, dry, TD 12,039 ft.

Union Producing Co. 5 Delta Sec. Co., Inc., 19-19s-19e, 1½ mi. N-NE of Lirette gas production, dry, TD 11,415 ft.

Vermilion Parish: Humble Oil & Refg. Co. C-1 La. Furs, Inc., 23-14s-2e, 6¼ mi. NE of East White Lake production, dry, TD 13,316 ft.

MISSISSIPPI

Franklin County Gets Good Condensate Well

JACKSON.—H. L. Hunt 1 W. L. Graves, in the Roxie area, 29-6n-2e, Franklin County, has been gaged and flowed at the rate of 553 bbl. of condensate plus 3,552,000 cu. ft. of gas, through a ½-in. choke, gravity 50.1°, gas-oil ratio 6,423, tubing pressure flowing 1,921 psi., shut-in tubing pressure 2,978 psi., with 0.6 per cent wash water. Perforations are at 10,578-85 ft., opposite the first "Stringer" sand below top of lower Tuscaloosa. The well now is shut in. Total depth is 10,990 ft.

In Marion County, approximately 1¼ miles north of the discovery well in Sandy Hook field, Union Producing Co. 2 Pittman, 12-1n-18w, has cored 6 ft. of gas sand at 9,006-12 ft. in the Lower Tuscaloosa section. Operators now are preparing to run a drill-stem test.

Gulf Refining Co. 4 Mrs. L. T. Simpson, 9-1n-16w, in Baxterville field, Lamar County, flowed an initial production of 288 bbl. of 16.3°-gravity oil through 7/32-in. choke. Total depth is 8,856 ft.

The California Co. 1 Robert Adams, 21-6n-8e, in Mallalieu field, Lincoln County, has been completed flowing 476 bbl. of 37.6°-gravity oil per day through a 19/64-in. choke, tubing pressure 340 psi., 0.2 per cent b.s. and w.

Magnolia Petroleum Co. 1 Z. Graham, 5-9n-7w, in Yellow Creek field, Wayne County, has been completed and on initial production test pumped 147 bbl. of oil plus 3 bbl. of salt water per day through perforations at 4,782-96 ft. Total depth is 4,945 ft.

MISSISSIPPI SUCCESSFUL WILDCATS

Franklin County: New gas-condensate discovery—H. L. Hunt 1 W. L. Graves, 29-6n-2e, TD 10,990 ft., perf. 10,578-85 ft., IP: 553 bbl. fo condensate per day plus 3,552,000 cu. ft. gas, through ½-in. choke, TP 1,921 psi., grav. 50.1°, GOR 6,423.

MISSISSIPPI WILDCAT FAILURES

Adams County: Big Chief Drilling Co. 1 E. Newell, 70-7n-2w, dry, TD 6,168 ft. Sohio Petroleum Co. 1 Eleanor V. V. Williams, 43-8n-2w, dry, TD 7,012 ft.

Forrest County: Superior Oil Co. 1 R. W. Langham, NW NE 13-5n-14w, dry, TD 9,500 ft.

Issaquena County: Amerada Petroleum Corp. 1 R. E. Bell, et al, Center SW NW 17-12n-7w, dry, TD 3,647 ft.

Lincoln County: The California Co. 1 Chas. Z. McCarthy, 14-8n-9e, dry, TD 10,700 ft.

Marion County: Humble Oil & Refg. Co. 1 T. Brady, Jr., et al 11-4n-12e, dry, TD 10,293 ft.

Walthall County: Gulf Refining Co. 1 Fernwood Lumber Co., NW NW, 23-4n-10e, dry, TD 11,502 ft.

Washington County: C. H. Murphy, Jr.-Sun 1 D. C. Wynn, 12-17n-8w, dry, TD 4,873 ft.

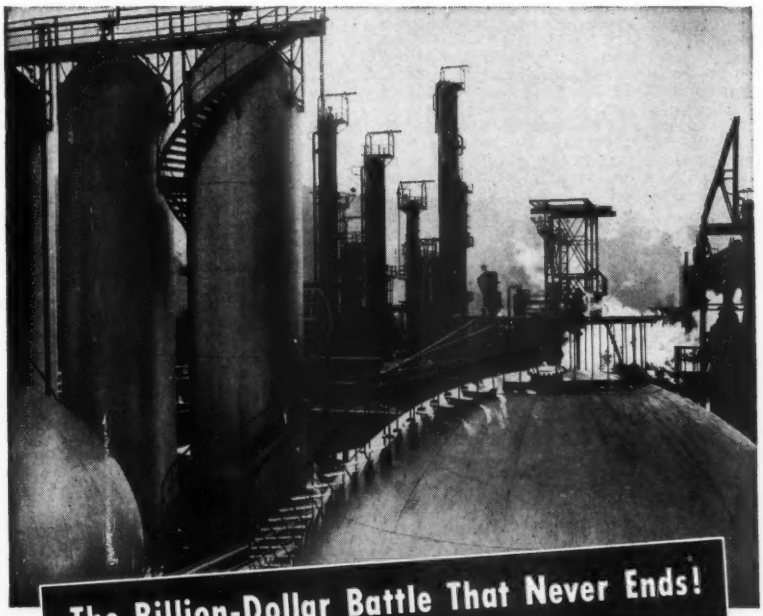
APPALACHIAN FIELD

South Penn Oil Co. Stakes Wildcat

PITTSBURGH.—In New Interest district, Randolph County, West Virginia, South Penn Oil Co. has made a wildcat location, the 1 J. W. Isner, elevation 1,973 ft. The well is located on the Belington Quadrangle, 5.20 miles south of Latitude 39 degrees, 5 minutes, and 3.95 miles west of Longitude 79 degrees, 45 minutes. In Elk district, Kanawha County, United Fuel Gas Co. completed the 6,424 A. I. Grubb for 6,166,000 cu. ft. of gas after shot. Tops were: Corniferous lime 4,905 ft., Oriskany sand 5,032 ft., gas 5,045-53 ft. Total depth was 5,053 ft. In Poca district, Kanawha County, James G. Vandergrift No. 2 M. M. Robertson Heirs gaged 5,350,000 cu. ft. of gas. Tops were: Corniferous lime 5,080 ft., Oriskany sand 5,207 ft., gas 5,214-20 ft. Total depth was 5,220 ft.

New locations reported in West Virginia were 18: Cross Creek district, Boone County; Elk district, Kanawha County; Court House district, Lewis County; Harts Creek and Laurel Hill districts, Lincoln County; McKim district, Pleasants County; Trap Hill district, Raleigh County; New Interest district, Randolph County; Lincoln district, Wayne County; Center district, Wetzel County; Walker district, Wood County; Baileysville, Center and Oceana districts, Wyoming County.

In Young Township, Indiana County, Pennsylvania, T. W. Phillips Gas & Oil Co. completed the 10 Rochester & Pittsburgh Coal Co. at total depth of 1,807 ft. with gas gaging 8,000,000 cu. ft. In Georges Township, Fayette County, the deep test of The Manufacturers Light & Heat Co., the 8 Barton Estate, encountered a fishing job at a depth



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of 10,312 ft. In Wayne Township, Erie County, Pennsylvania Gas Co. 1 A. D. Peterson is shut down at a depth of 4,603 ft. with gas testing 74,000 cu. ft. in the White Medina sand at 4,458-65 ft. The elevation of this well is 1,862 ft.

New locations reported in Pennsylvania were two: Nicholson and German townships, Fayette County.

N. CENTRAL TEXAS

Eanes Field Gets Second Well

WICHITA FALLS. — Star Oil Co., Inc., brought in Eanes field's second well, 5 years after the discovery by Sinclair Prairie Oil Co. The new test is 1 J. H. Eanes, G. A. Bench Survey, located about 6½ miles southwest of Bowie in Montague County, and 1,200 ft. northeast of Sinclair's well, which is said to be still flowing. According to one report, the 1 Eanes was drilled to the conglomerate, then plugged back to the Caddo around 5,600 ft., where it blew out, spraying oil. A second report placed perforations at 5,633-65 ft., in the conglomerate. After 1,000 gal. of acid, the well kicked off to flow 62 bbl. of oil in 20 hours through 10/63-in. choke. Further tests were to be made before taking potential.

Seven miles southeast of Bowie, Continental Oil Co. 1 Richardson was drilling ahead below 6,373 ft. in shale, after recovering a show of oil on a drill-stem test from 6,071-87 ft. The formation tested was not identified.

In northeastern Montague, Russell Maguire 1-B Stansall, conglomerate discovery 3 miles west of Nocona, was completed from perforations at 5,385-5,405 ft., for a daily potential of 92 bbl. of oil a day, on the pump.

In Jack County, Sorrells Oil Co. 1 A. D. Campsey, Block 31, Wood County School Lands, 9 miles east of Antelope, had distillate in the Ellenburger, topped at 6,334 ft., according to one report, and 6,400 ft. on a second report. A 1-hour drill-stem test from 6,334-6,465 ft. brought gas to the surface in 21 minutes and recovered 100 ft. of clean distillate and 385 ft. of distillate-cut drilling mud. Operators drilled to 6,515 ft., ran electrical surveys and set casing to 6,460 ft. for completion attempt.

One-half mile west of Chico field main area, Bridwell Oil Co. 1 Berry, J. C. Perry Survey, showed gas in 7 minutes and oil in 47 minutes, on a drill-stem test from 5,556-90 ft. Recovery was 1,900 ft. of free oil, plus an unestimated amount that was allowed to flow for 28 minutes. It was deepened to 5,780 ft., and casing set on bottom for completion. According to reports, the well indicates the field's deepest production at this time.

In Throckmorton County, Fred M. Manning 6-A Brown, east outpost to Record Mississippi field, recovered 35 ft. of gas-cut mud on a 1-hour drill-stem test from 4,332-41 ft., and continued drilling below 4,400 ft. Manning 1-J Goodstein - Brown, wildcat 3 miles west of Throckmorton, was drilling below 4,181 ft. Woodley Petroleum Co. 1 J. L. Pedens, Block 689, TE&L Survey, approximately 1 mile northeast of production in the Odell Deep field, was drilling below 3,300 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Brown County: B. R. W. Oil Co. 2 J. Jopling, G. C. Bragg Sur., 3 mi. W Brownwood, pumped 24 bbl. 36°-grav. oil a day, limestone 1,726-41 ft., TD 1,747 ft.

Montague County: Russell Maguire 1 B. Stansall, Blk. 70, Wm. Ainsworth Sur., A-1, 3¼ mi. W Nocona, pumped 92 bbl. 46°-grav. oil a day, GOR 750 cu. ft., conglomerate 5,385-5,405 ft., TD 5,764 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: J. W. Hastings 1 Mangold, P. Castleman Sur., 4 mi. NW Mankins, dry, TD 1,801 ft.

P. P. Langford, Jr., 1 J. M. Powell, Rachel Story Sur. 148, 3 mi. NE Archer City, dry, TD 4,023 ft.

Brown County: A. R. Jordan 1 A. O. Angel, B. H. Garvin Sur., 3 mi. W May, dry, TD 3,101 ft., Caddo 2,151 ft., Marble Falls 2,678 ft., Mississippi 3,065 ft., elev. 1,580 ft.

Comanche County: Collis and Slaughter 2 E. O. Cosby, Eleanor Moore Sur., 5 mi. SW DeLeon, dry, TD 3,140 ft., Barnett shale 2,955 ft., Ellenburger 3,020 ft., elev. 1,244 ft.

A. W. Gregg 1 J. T. Quinn, Nathaniel Green Sur., 4 mi. W DeLeon, dry, TD 3,223 ft., Mississippi 3,098 ft.

Eastland County: Luling Oil & Gas Co. 1 Blackwell, D&DA Sur., 5 mi. W Gorman, dry, TD 3,277 ft.

Rathke Oil Co. 1 C. W. Stroebel, Sec. 117, Blk. 3, H&TC Sur., 1 mi. W Nimrod, dry, TD 3,918 ft., pumped 2 bbl. oil a day, 17 bbl. salt water, from Ellenburger 3,910-17 ft., oil apparently exhausted and water increased.

Robbins & Jackson 1 J. T. Hammett, Robert Henderson Sur., 1 mi. NW Okra, dry, TD 3,260 ft., Caddo 2,551 ft., Marble Falls 2,889 ft., Barnett shale 3,163 ft., elev. 1,578 ft.

Star Oil Co. 1 M. E. Flipen "A," J. Douglas Sur., 2 mi. SW Pioneer, dry, TD 3,650 ft., Caddo 2,603 ft., Ellenburger 3,546 ft.

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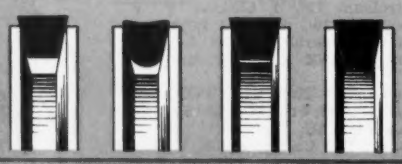

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Haskell County: W. P. Carr 1 F. T. Sanders, J. N. Gainer Sur., 5 mi. SE Haskell, dry, TD 3,623 ft., Dotham 1,519 ft., Strawn 3,580 ft.

Montague County: A. G. Talbot 1 Ervy Harper, G. Bayne Sur., 7 mi. N Nacona, dry, TD 2,175 ft.

Shackelford County: M. J. Mitchell 1 J. Lescher, Sec. 34, BAL Sur., 5 mi. SE Albany, dry, TD 4,442 ft., Strawn sand 2,985 ft., Caddo 3,795 ft., Ellenburger 4,387 ft.

Young County: Dub Wood Drilling Co. 1 A. Furr, Sec. 319, TE&L Sur., 1½ mi. E Padgett, dry, TD 1,126 ft., Gunsight lime 1,013 ft.

SOUTHWEST TEXAS

New Discovery in Brooks County for Humble

CORPUS CHRISTI.—A new oil discovery for southeastern Brooks County, Humble Oil & Refining Co. 1 Santa Fe Ranch, has been gaged at 65 bbl. of oil in 21 hours through a ⅛-in. choke with gas-oil ratio of 3,610, making 34°-gravity oil, on an initial test through perforations at 3,235-42 ft. Sand with oil saturation was encountered at 6,870-6,901 ft. However, operators were unable to develop commercial production at that level. Total depth is 9,005 ft., with 9⅝-in. casing set at 7,064 ft. This discovery is located in San Salvador del Tule grant, 6½ miles southeast of Encino. Operators have made location for 2 Santa Fe Ranch, 1,320 ft. easterly from the No. 1 well.

Atlantic Refining Co. 1 V. G. Gwynn, recent oil discovery approximately 3 miles southwest of Fulton Beach field, in Aransas County, flowed on potential gage 41.4 bbl. of oil per day through a 9/64-in. choke, plus 23 per cent salt water. Production is through perforations at 7,209-14 ft., with top of pay zone at 7,209 ft. Total depth is 10,000 ft., with a plugged-back depth of 7,250 ft. Tubing pressure 400 psi., casing sealed. Gas-oil ratio was 763. This new discovery is located in Salt Lake, a small body of water on Live Oak Peninsula, 3 miles northwest of Rockport. The No. 2 Gwynn will be spotted 1,320 ft. southward.

A new oil field for Atascosa County is being opened at Kirkwood & Morgan and Placid Oil Co. 1 Louis Eisenhauer, 10 miles north of Charlotte, which is flowing oil with 300 psi. tubing pressure and 450 psi. casing pressure through a ¼-in. choke. No gage has been reported as yet. Total depth is 5,180 ft., in Austin Chalk, with drill pipe stuck at 5,143 ft. following a blowout and cemented at that level for the completion in open hole at 5,143-80 ft. This well is in Diego Perez Survey 1194, Abstract 665.

Also in Atascosa County, McFarland Drilling Co. 2 Henrietta Krisch et al, wildcat, 3 miles north of Poteet, is swabbing heavy mud out of hole at approximately 1,300 ft., swabbing in from open hole at 3,573-3,612 ft. Total depth is 3,612 ft., with 4-in. casing set to 3,573 ft. on top of the pay. On 29-minute test from 3,573-86 ft., developed 210 psi. working pressure on ¼-in. chokes, and flowed 41.5°-gravity pipeline oil, bottom-hole flowing pressure 1,300 psi.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Aransas County: New oil pool, Salt Lake—Atlantic Refg. Co. 1 V. G. Gwynn, in Joseph Hollis Sur., A-76, 3 mi. NW of Rockport, 3 mi. SW of Fulton Beach field in "Salt Lake," TD 10,000 ft., PB to 7,250 ft., top pay 7,209 ft., perf. 7,209-14 ft., IP: 41 bbl. oil per day through a 9/64-in. choke, GOR 763, TP 400 psi., casing sealed, grav. 41.6°, comp. 11-16-48.

Frio County: New oil pool—Lewis Oil Co. B-1 Oppenheimer & Lang, in J. A. Pranglin Sur. 10, 8 mi. SW of Charlotte and 3½ mi. SW of Charlotte field, 3 mi. W of Frio-Atascosa county line, TD 5,588 ft., top pay 5,542 ft., open hole 5,567-88 ft., IP: 10 bbl. oil per day through 3/16-in. choke, GOR 8,200, TP 625 psi., CP 2,100 psi., grav. 40.1°, comp. 11-6-48.

Starr County: New gas pool—Sun Oil Co. 1 Austin est., Share 90, Por. 39, 5 mi. NW of Sullivan City and 3 mi. N of Coastal field, TD 5,800 ft., top pay 3,724 ft., perf. 3,724-36 ft., IP: 9,000,000 cu. ft. gas per day (dry gas), on open flow, shut-in pressure 1,430 psi., comp. 11-6-48.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Bastrop County: G. C. Schoonmaker 1 W. R. Gillum, in Richard Young Sur., 2 mi. S of Elgin, dry, TD 2,191 ft.

Caldwell County: L. L. Carter 1 Jet Connoly, in Esther Berry Sur., 5 mi. S of Lockhart, dry, TD 2,173 ft.

Duval County: Atlantic Refg. Co. 2 Hagist Ranch, Inc., BS&F Sur., 267, 1½ mi. NE of Eagle Hill field, dry, TD 2,761 ft.

Magnolia Pet. Co. 5 Duval County Ranch Co., in Block 9, Duval Co. Schl. Land Sur. 196, 12 mi. SW of Freer, dry, TD 2,490 ft.

Jim Hogg County: The Texas Co. B-5 T. T. East, in Blk. 10, Leyendecker Subd. 2, of sh. 3, "Las Moritas" Rafael de la Pena Sur., ⅓ mi. S of Neuhaus field, dry, TD 2,911 ft.

Yegua Corp. 2 J. Vela Pena et al, in sh. 3, El Peyote gr., (Sur. 589), 25 mi. SW of Hebbronville, dry, TD 1,587 ft.

McMullen County: Edwin M. Jones est. 1 Shiner Ranch, in M&C Sur. 19, SW of San Caja, 16 mi. SW of Simmons City, dry, TD 7,621 ft.

Nueces County: La Gloria Corp. 1 F. V. & O. E. Arnim, Sec. 7, Laureles Farm trs., 4¼ mi. E-NE of London field, dry, TD 7,018 ft.

Starr County: A. & T. Drilling Co. 4 Anna

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M. Kelsey, Sur. 7, 20 mi. N of Roma, 8½ mi. SW of Guerra field, dry, TD 1,119 ft.

Webb County: Sid Katz 3 A. M. Bruni est., Blk. 26, Sec. 26, Brown Subd., Albercas grant, 12 mi. SW of Bruni, dry, TD 2,189 ft.

Zapata County: R. P. Schwab et al B-1 A. Garcia, in Charco Redondo grant, 32 mi. SE of Zapata, dry, TD 1,896 ft.

CANADIAN FIELDS

Good Showing Found In Edmonton Wildcat

CALGARY. — The 1 Stanolind - Imperial - Barrhead wildcat, LSD 15, 10-58-5w5, about 55 miles northwest of Edmonton, has found a section of Madison limestone, and encountered encouraging showings in drill-stem test. The Madison was topped at 3,980 ft. (ground elevation is 2,268 ft.) A drill-stem test from 3,992 ft. to bottom, 4,018 ft., was run, and a pipe recovery of 375 ft. of oil-cut mud was obtained. Estimated natural-gas-flow rate was around 150,000 cu. ft. daily during the 45-minute test. The well is now coring below 4,036 ft.

The 1 Pan-Ranchmen, LSD 4, 17-20-28w4, located near Aldersyde, about 25 miles southeast of Calgary, has contacted the Dalhousie sand at 7,159 ft. This important wildcat is now coring below 7,181 ft., preliminary to testing for possibilities of oil in one of its main objective, the Dalhousie.

Good showings of gas and light crude oil have been encountered in the Dalhousie sand at various previous wells in this area. The top of the Madison is looked for at around 7,300 ft.

Redwater Petroleums, Ltd., has staked its first exploration well in Alberta. The initial wildcat venture, 1 Redwater Pete, LSD 16, 36-55-21w4, is about 12 miles south and east of 1 Imperial-Redwater 1 discovery well and 8 miles due south of 3 Imperial-Redwater driller. Redwater Pete was spudded December 7 and currently is preparing to run surface casing.

A newly inaugurated Calgary independent, Midland Petroleums, Ltd., has staked location for its first well on a seismograph anomaly about 15 miles west of Edmonton. The site, about 8 miles northwest of Imperial's Woodbend oil wells, is located near the village of Spruce Grove in LSD 11, 23-52-27w4. Location for 1 Midland was picked entirely on conditions as revealed by an Imperial Oil seismic survey and its interpretation by Imperial's geophysical department. All data were made available by Imperial.

During the past few days Imperial Oil, Ltd., has placed four more Leduc wells and one Woodbend well on production. All five completions are in the D3 zone of the Devonian and will be operated at approximately 150 bbl. daily, the D3 zone allowable.

The 129 Imperial-Leduc, LSD 9, 8-50-26w4, initial open-flow potential 2,435 bbl. daily; No. 112, LSD 1, 33-50-26w4, potential 1,245 bbl. daily; No. 74, LSD 12, 19-50-26w4, potential 1,240 bbl. daily; No. 93, LSD 14, 26-50-26w4, potential 439 bbl. daily; and 1 Imperial - Woodbend, LSD 11, 16-51-26w4, rated flush potential of 1,224 bbl. daily.

Site for 14 Imperial-Woodbend, in LSD 11, 9-51-26w4, is about ½ mile south of the current southwest corner of the Woodbend proven area. The location for No. 14 is being prepared, and will commence drilling as soon as rig is made available from one of Imperial's current operations in that field.

At Leduc, Imperial has staked another nine locations in the past few days. All new sites are in the proven area at Leduc. These locations, Nos. 135, 142, 144, 145, 146, 148, 149, and 150, are from ¼ to ½ mile from current producing wells.

In the Southern part of Leduc field, Okalta Oils-Leduc No. 5, LSD 10, 33-49-26w4, has success assured in the D2 zone of the Devonian, and is now heading for the D3. The D2 zone was topped at 5,250 ft. (K.B. elevation 2,409 ft.) A drill-stem test run at bottom 5,284 ft. gave a flow of oil to the surface in 50 minutes. During the 1-hour test there was a mixmum natural-gas-flow rate of 300,000 cu. ft.

The 3 Hanna Petroleums, LSD 14, 5-31-14w4, indicated Sunburst sand oil discovery well about a mile southwest of Hanna town, is preparing to run production string of casing. The oil sand showed about 3,711 ft., and about 5 ft. of oil saturation was cored and favorably tested before going on to find no production in the sliver of Madison lime underlying Banff in which drilling was completed at 3,755 ft. The oil recovered in drill-stem tests measured 37.2°.

MICHIGAN

Activity Reflects General Year-End Shutdown

MOUNT PLEASANT.—General activity in all areas of the state was reflecting the preholiday and end of year slowdown with only 15 completions in all Michigan districts for the current period. However, development and exploration drilling was still more active than in the same 1947 period.

Of the total number of well completions this week, five were classified as wildcats with one being finished as discovery well in Clinton County.

Mercer Oil Co., Inc., 1 Werner, SW SW SW 34-8n-4w, after several weeks of testing, was rated a new Traverse lime discovery at a total depth of 2,549 ft. Wildcat was rated good for 15 bbl. oil and 15 bbl. salt water per day natural. Acreage around this wildcat is owned by Mercer; Carter Oil Co.; Socony-Vacuum Oil Co., Inc., McClanahan Oil Co.; Ohio Oil Co., and Superior Oil Co. It is expected that a follow-up drilling program will be started in the district early next year.

Seven new field producers were completed in six different pools. Three field wells were dry in objective horizons.

Louis Rose 1 Goodrich, SW SW NW 27-20n-17w, Mason County wildcat, which has been closely watched while Traverse, Dundee and Monroe horizons were gun-perforated and tested, was completed dry at a total depth of 1,981 ft., but preliminary discussions were reported in progress regarding another wildcat test in the general area.

Of the 11 new drilling permits approved this week, 6 were classified as wildcat tests and 5 were for new field wells. Total number of permits written by the Michigan Department of Conservation up to December 3, 1948, was 902, compared to a total of 887 during all of 1947.

MICHIGAN SUCCESSFUL WILDCAT

Clinton County, Lebanon Township: Mercer Oil Co., Inc., 1 Werner, SW SW SW 34-8n-4w, 15 bbl. with water, Traverse 2,534 ft., TD 2,549 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Clyde Township: Ohio Oil Co. 1 Victor P. Gassen, SW NW SW 35-2n-15w, dry in Traverse lime, TD 1,264 ft.

Mason County, Grant Township: Louis Rose 1 James Goodrich, SW SW NW 27-20n-17w, dry in Traverse, Dundee and Monroe, TD 1,981 ft.

Mecosta County, Big Rapids Township: Scott Drilling, Inc., 1 Antcliff & Calvetti, C NW 18-15n-10w, dry in Michigan Stray sand, TD 1,327 ft.

Missaukee County, Aetna Township: Leonard Oil, Inc., 1 Felder, NW NW SE 21-22n-6w, dry in Dundee, TD 4,078 ft.

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TEXAS GULF COAST

Sohio Completing Second Well in Lane City

HOUSTON.—Sohio Petroleum Co. et al is completing its second well in the town of Lane City in Wharton County. The 1 R. L. Fields, in the D. D. D. Baker Survey, Block 26 of Lane City, was drilled to a total depth of 5,597 ft., and production casing cemented on bottom. Perforations were made from 5,448-5,455 ft. for the completion and well kicked off flowing 120 bbl. of 26°-gravity pipe-line oil per day flowing pressure on tubing at 500 psi. The well continues to flow. This is the third producer for Lane City townsite field.

Smith & McBride 1 Carl Weise, new gas-condensate discovery in northern Goliad County, approximately 1 mile west of Weesatche field and 1½ miles northeast of the Melrose field gas-condensate discovery, has been gaged at 156 bbl. of 65°-gravity condensate per day through a 3/16-in. choke, with 2,395 psi. tubing pressure and 2,605 psi. shut-in. pressure. Production is through perforations at 7,843-58 ft. in the Slick sand of the upper Wilcox or Carrizo zone.

Western National Gas Co. 1 Wm, L. Reinecke, extension well approximately ½ mile north of the discovery well at Mission Valley gas-condensate field, Victoria County, has been gaged at 34,000,000 cu. ft. of gas per day on open flow with a gas-condensate ratio of 36,000. Production is through perforations at 8,373-88 ft., with total depth at 9,051 ft., and 5½-in. production string set on bottom.

Twelve miles southeast of Hallettsville, in Lavaca Ciunty, Grubb & Hawkins 1 S. A. Clark, wildcat test, has been completed for a gas producer through perforations at 1,650-70 ft. The well blew out after it had reached a total depth of 4,970 ft., and blew wild a number of days, making large volumes of gas. Operators killed the well and sidetracked the old hole at 1,900 ft. and drilled to total depth of 5,833 ft. This well is located in J. H. Clayton Survey, 4 miles west-southwest of Provident City field.

A new gas-condensate pool for Harris County, 1 mile northwest of Aldine, has been opened at F. M. Corzelius 2 H. H. Rath, located in the William Sevey Survey, Abstract 699. Total depth is 7,773 ft., with top of pay at 7,361 ft. On a ¼-in. choke, the well flowed at the rate of 3,521,000 cu. ft. of gas per day along with 72.36 bbl. of 59.6°-gravity condensate through perforations at 7,361-7,365 ft. The 7-in. casing was set at a depth of 7,418 ft.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Goliad County: Extension to Melrose field H. R. Smith & W. C. McBride, Inc., 1 Carl Weise, in R. E. Handy Sur., A-156, 3 mi. SW of Weesatche, and 1½ mi. NE of Melrose field gas-condensate discovery, top pay 7,843 ft. (Slick sand), TD 8,295 ft., perf. 7,843-58 ft., IP: 12,800,000 cu. ft. gas per day on open flow, gas-condensate ratio 16,400. (Flowed 156 bbl. condensate per day through 3/16-in. choke, TP 2,395 psi., plus 2,518,000 cu. ft. gas per day). Shut-in pressure 2,605 psi., grav. 65°, comp. 11-24-48.

Harris County: New gas-condensate discovery—F. M. Corzelius 2 H. H. Rath, in W. Sevey Sur., 1 mi. NW of Aldine, TD 7,773 ft., top sand 7,361 ft., perf. 7,361-65 ft., IP: 3,571,000 cu. ft. gas per day and 72 bbl. condensate per day through ¼-in. choke, TP 2,406 psi., shut-in pressure 2,606 psi., grav. 59.6°. Open flow calculated 34,000,000 cu. ft. gas per day, comp. 11-29-48.

Jackson County: New gas pay, Little Kentucky field—W. L. Pickens 3 John Kramer, in Morris & Cummings Sur. 34, A-301, top pay 5,792 ft., TD 6,017 ft., perf. 5,792-98 ft., IP: 500,000 cu. ft.

gas per day through a 9/64-in. choke, no water, comp. 11-19-48.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Chambers County: The Texas Co. 1 Bruce Richardson, in John Steel Sur., 1½ mi. SE of Cedar Bayou townsite, in Jergins area, dry, TD 6,702 ft.

Galveston County: H. L. Hunt 1 Robert R. Flaniken, in Mary Austin Sur., A-1, Thaman Subd. 1, dry, TD 10,577 ft.

Stanolind 2 State Lease 31602, Tr. 144, in Gulf of Mexico, 15.5 mi. NE of Galveston, dry, TD 1,741 ft.

Sam E. Wilson, Jr., 3 Davis et al, League City area, in M. Muldoon League grant, Lot 82, dry, TD 9,009 ft.

Lee County: L. M. Lockhart 1 J. A. Reat, in John Newton Sur., north of Lexington townsite, dry, TD 10,015 ft.

Karnes County: Kirkwood & Morgan, Inc., et al 1 A. Esparza, in Caspar Flores Sur., 6 mi. W of Falls City, dry, TD 6,258 ft.

Wharton County: Maynard & Adolph Smith 1 L. M. Eldridge, in John Huff League, 1¼ mi. NW of Iago townsite, dry, TD 5,878 ft.

Wilson County: E. W. Gill & Alaska Steamship Co. et al Mrs. Penn McDaniel Texas, in David J. Holt Sur. 98, 9 mi. E of Poth, dry, TD 4,136 ft.

KANSAS

Barton County Wildcat Gets Show of Oil

ALADDIN PETROLEUM CORP. and Hannum Drilling Co. had a show of oil and gas near the top of the Lansing-Kansas City at 1 Brody, SW SW SE 23-19s-12w, Barton County. A 15-minute drill-stem test made at 3,093-3,165 ft. recovered 1,140 ft. of gassy oil and mud. This test was made just below the top of the Lansing and operator is preparing to run another at 3,220-66 ft. The well is about 1 mile north of Hammer pool and the Lansing top is reported to be higher than in other tests to the north and east.

Also in Barton County, the discovery well, Alpine Oil & Royalty Co. 1 Bryant, NW SW NE 27-20s-12w, has been completed in the Arbuckle with a pumping potential of 171 bbl. per day. Casing was set on top of the Arbuckle at 3,383 ft. and hole carried to 3,405 ft.

In the area 1 mile east of Hiss pool, Ben F. Brack, Inc. 1 Wright, NE NE SW 32-20s-13w, is swabbing 5½ bbl. per hour from the Arbuckle topped at 3,545 ft. Total depth is 3,561 ft.

Amerada Petroleum Corp. is planning a rank wildcat in Pawnee County. The location, 1 O'Dell, SW SW NW 15-22s-17w, about 7 miles northeast of the small Garfield pool.

In Graham County, Derby Oil Co. and Peele Drilling Co. 1 Toll, SW SW SE 15-7s-25w, found salt water in a 30-minute test of the Arbuckle, topped at 4,237 ft. and will plug back for tests in the Lansing-Kansas City. The Lansing was topped at 3,739 ft., and the well had a small show at 3,810-83 ft.

KANSAS SUCCESSFUL WILDCAT

Butler County: Shawver-Graham 1 George Cousins, SW SW NW 4-29s-5e, pumped 25 bbl. of oil per day from Bartlesville at 2,796-2,804 ft.; Kansas City 2,216 ft., TD 2,804 ft.

KANSAS WILDCAT FAILURES

Cowley County: Woods Drilling Co. 1 Willison, NW SE NW 31-34s-8e, dry, TD 4,000 ft., lower Stalnaker 1,615 ft., Layton 1,778 ft., Misener 2,045 ft., Oswego 2,275 ft., Burbank 2,641 ft., Mississippi lime 2,698 ft., Peru 3,120 ft.

Ellis County: Herndon Drilling Co. 1 F. Bemis "A," NE NE NE 15-12s-19w, dry, TD 4,015 ft., Heebner 3,495 ft., lime 3,526 ft., Lansing 3,542 ft., cherty conglomerate 3,844 ft., Arbuckle 3,968 ft.

Marion County: Bay Petroleum Co. 1 Funk, SE SE NE 20-19s-1e, dry, TD 3,357 ft., Mississippian 2,826 ft., Viola 3,274 ft., Simpson 3,352 ft.

Pawnee County: Magnolia Petroleum 1 W. A. Hayes, NE NE SE 28-21s-17w, dry, TD 3,916 ft., anhydrite 1,050 ft., Lansing 3,522 ft., conglomerate 3,866 ft., Arbuckle 3,883 ft.

J. J. Lynn 1 Johnson, SW SW SW 13-23s-15w, dry, TD 4,127 ft., anhydrite 920 ft., Heebner 3,457 ft., Lansing 3,612 ft., conglomerate 3,950 ft., Viola 3,973 ft., Simpson 4,044 ft., Arbuckle 4,083 ft.

Rooks County: Champlin Refining Co. 1 Teall, SE SE NE 17-10s-20w, dry, TD 3,995 ft., Topeka 3,284 ft., Lansing 3,535 ft., Arbuckle 3,944 ft.

Stafford County: Birmingham & Bartlett et al 1 Smith, SE SE SW 7-22s-14w, dry, TD 3,935 ft., anhydrite 890 ft., Lansing 3,493 ft., lime 3,477 ft., Viola 3,782 ft., Simpson 3,847 ft., Arbuckle 3,904 ft.

ILLINOIS

Saline County Discovery Tests Tar Springs

MATTOON. — The Saline County pool opener, George C. Schoonmaker 1 Pemberton-Parks, SE SE SW 33-7s-7e, is testing Tar Springs and is reported to be making about 100 bbl. per day following a 20-qt. shot. The pay sand is at 2,280-89 ft. The well is about 3 miles north of Eldorado pool.

In Gallatin County, Ashland Oil & Refining Co. et al 1 Maloney, SE SE SW 25-8s-9e, recovered 2 ft. of oil and 10 ft. of mud on a 1-hour drill-stem test at 875-921 ft.

Sohio Petroleum Co. has a McClosky show at 1 E. Lomas, SW NW SW 5-1n-10e, Ed-

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wards County, and is running casing for further tests. A 2½-hour drill-stem test at 3,256-61 ft. recovered 720 ft. of gas and 35 ft. of oily mud.

Gulf Refining Co. is cleaning out and testing the McClosky at 1 W. S. Rush, NE NE NE 35-2n-5e, Wayne County, about 6 miles northwest of Johnsonville pool. Crew swabbed 101 bbl. of oil and 2 bbl. of water in 23 hours from pay at 2,964-68 ft.

ILLINOIS WILDCAT FAILURES

Coles County: L. Deay and Reusch 1 Baird Brothers, SE NE SE 6-13n-8e, dry, TD 443 ft.

Jasper County: Chalmer-Farmhall 1 J. Short, SW SW NW 14-7n-10e, dry, TD 2,660 ft.

Madison County: Joe Kesl, Jr., 1 W. Albrecht, Jr., SW SE NE 30-6n-6w, dry, TD 569 ft.

Montgomery County: White 1 L. Clodfelter, SW SW SW 36-10n-5w, dry, TD 651 ft.

Wayne County: Nash Redwine 1 S. Redd, SE NW SE 6-2s-7e, dry, TD 3,374 ft.

EASTERN TEXAS

Cherokee Test Making Better Shows

DALLAS.—Standard Oil Co. of Texas 1 T. E. Acker, T. R. Walker Survey, northwest of Maydelle in Cherokee County, continued testing the Rodessa around 8,600 ft., and was making better shows for commercial production. A 10,000-gal. acid treatment through perforations at 8,610-50 ft., broke the formation down at 2,200 psi. After treatment, a 15-hour test through ¼-in. choke flowed gas at the rate of 8,800,000 cu. ft. daily, plus 2½ bbl. of oil or distillate an hour, cut 20 per cent with salt water. Flowing tubing pressure was 3,225 psi. A 16-hour test, through 3/16-in. choke, produced slightly less gas, but yielded distillate at the rate of 3 bbl. an hour. Tubing pressure was 3,400 psi.

Humble Oil & Refining Co. released all information on its 1 McWatters, deep Freestone County wildcat. Early in the week tests were started on perforations at 11,596-11,623 ft. With packer at 11,552 ft., mud displaced with 50 bbl. of water, it was opened but would not flow. Operators started swabbing, recovering wash water in lowering fluid level down to 7,200 ft. Further swabbing recovered brackish water with slight gas show. On last report, fluid was swabbed down from 3,200 to 9,800 ft. from surface.

Stanolind Oil & Gas Co. 1 Deupree, southeast of Athens in Henderson County, was making slow progress in lime and shale at 11,388 ft. A. O. Phillips 1 Bert Davis, 1½ miles south of Nelta, Hopkins County, was below 4,276 ft. in lime. Humble 1 E. N. Rylie, 4 miles southeast of Kemp in Kaufman County, was drilling at 4,316 ft.

Six miles east of Patroon, M. E. Davis 1 Bridges, Shelby County, had a drilling break at 5,880-96 ft., with cutting time dropping from 16 to 1½ minutes per foot. Cuttings showed soft lime, with no shows.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURES

Cherokee County: Burk Royalty Co. 1 W. W. Mays, W. H. Walters Sur., 18½ mi. SE Jacksonville, dry, TD 4,950 ft. R. J. Caraway 1 A. F. Sessions, J. M. Musquez Sur., 11 mi. E Rusk, dry, TD 4,481 ft., Woodbine 4,420 ft.

Collins County: J. F. Kightliger and Senka 1 J. L. Uland, S. Walker Sur., 3 mi. N Farmersville, dry, TD 2,810 ft. in lime.

Falls County: Corley, Sackett et al 1 L. V. Holbert, W. Herrington Sur., 3 mi. NE Bremond, dry, TD 4,401 ft., Pecan 2,136-2,228 ft., Austin 3,239-3,490 ft., Eagleford 3,490 ft., Buda 3,905 ft., Edwards 4,367 ft.

Wood County: Edson Petroleum Co. 1 J. L. Jacobs, W. Caison Sur., A-123, 3 mi. SW Winnsboro, dry, TD 4,610 ft., show of asphalt 4,125-60 ft.

OKLAHOMA

Garvin County Discovery Flows 300 Bbl. Per Day

THE Golden Trend portion of Garvin County has another prospective pool opener at The California Co. 1 K. Graham, NE NE SW 36-4n-3w. Operator set casing at 7,682 ft. and perforated with 24 holes at 7,550-54 ft. Well flowed 150 bbl. in 12 hours through ¼-in. choke. The new discovery is south of Southwest Maysville pool.

The Elk City area has another oil zone in Union Producing Co. 1-A Music, C NE SW 24-10n-21w, Beckham County. A drill-stem test made at 9,294-9,318 ft. with tool open for 17 minutes, had gas in 7 minutes and recovered 2,470 ft. of 45°-gravity oil plus 190 ft. of oil and gas-cut mud. Shut-in pressure was 2,915 psi. This well also had oil on drill-stem tests at 7,061-7,195 ft. and gas plus distillate at 7,037-61 ft. From an elevation of 1,843 ft., the datum of the new pay is —3,381-7,475 ft. which is just a little lower than the oil pay in the discovery well in Section 14 and near the same depth as the lower oil zone at Shell Oil Co. 1 Long in Section 15.

Shell Oil Co. has found additional pay in the deep gas-distillate zone at 1 Long, C NE SW 15-10n-21w. Crew ran a drill-stem test at 9,549-9,650 ft. resulting in production of distillate at the rate of 396 bbl. per day plus 2,867,000 cu. ft. of gas. Another drill-stem test at 9,653-9,700 ft. showed distillate rated at 672 bbl. per day plus 3,800,000 cu. ft. of gas. Chokes were ⅜ in. at bottom and ½ in. at top. This indicates good distillate pay from —7,566 ft. to —7,717 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Noble County: Extension to South Ceres—Howell 1 Osborne, SE SW SW 13-23n-1w, flowed 80 bbl. of oil per day through 12/64-in. tubing choke from

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Bartlesville at 4,382-4,414 ft., TD 4,445 ft.

Okfuskee County: Mohawk 1 Foster, SE SW NW 14-10n-9e, pumped 20 bbl. of 33.8°-gravity oil per day from Gilcrease at 3,026-92 ft., TD 3,290 ft.

Payne County: Jergins 1 Buckles, SE NW SW 28-18n-4e, gaged 1,500,000 cu. ft. of gas from Skinner at 3,514-26 ft., TD 3,702 ft.

Seminole County: Discovery of Southwest Keokuk—Blair 1 Madgett, NW SW NE 4-10n-6e, flowed 60 bbl. of oil per day through ¼-in. tubing choke from Misener at 4,265-75 ft., TD.

OKLAHOMA WILDCAT FAILURES

Creek County: Murta 1 Turnbull, SW SW SW 7-14n-8e, dry, TD 3,378 ft., lower Layton 1,270-1,310 ft., Checkerboard 1,500-08 ft., conglomerate 1,555 ft., Oswego 2,402-37 ft., Prue 2,440 ft., Prue sand 2,470-2,500 ft., Verdigris 2,512-17 ft., Skinner 2,590 ft., Bartlesville 2,928 ft., sand 3,015-3,112 ft., Dutcher 3,275 ft., sand 3,280-90 ft. and 3,312-20 ft., lower Dutcher 3,345-77 ft.

Garvin County: California 1 Baldwin, SE NE NE 34-1n-1e, dry, TD 7,505 ft., no tops reported.

Jefferson County: Seitz 1 Rankin, SW NE SE 17-6s-6w, dry, TD 2,588 ft. in shale, lime 1,650 ft., sands 2,365-80 ft., 2,383-2,452 ft. and 2,463-70 ft.

Lincoln County: Davon 1 Stanfill, SW SW SE 5-13n-3e, dry, TD 4,741 ft., Pawhuska 1,400 ft., Avant 2,985 ft., Hogshooter 3,220 ft., Checkerboard 3,570 ft., conglomerate 3,630 ft., Oswego 4,200 ft., Prue 4,250 ft., Verdigris 4,356 ft., Inola 4,540 ft., Bartlesville 4,657 ft., lime 4,737 ft.

Logan County: Jordan 2 Dean, NW NE NE 7-15n-1e, dry, TD 5,124 ft., Bartlesville sand 5,096 ft.

McIntosh County: Shaller 1 Schlot, SW SE SW 14-12n-16e, dry, TD 752 ft., gas sand 425 ft. with 25,000 cu. ft. of gas.

Pottawatomie County: Sunray 1 Patrick, SW SE SE 8-8n-2e, dry, TD 6,059 ft., Hunton 5,246 ft., Sylvan 5,590 ft., Viola 5,686 ft., second Wilcox 6,041 ft.

Seminole County: Sun 1 Reed, NW NW SE 31-10n-8e, TD 4,465 ft., Calvin 1,680 ft., lower Calvin 1,960 ft., Senora sand 2,234 ft., lime 3,170 ft., Booch 3,290 ft., Gilcrease 3,500 ft., Wapanucka 3,652 ft., Cromwell 3,676 ft., Caney 3,800 ft., Woodford 4,175 ft., Misener 4,201 ft., Hunton 4,210 ft., Sulvan 4,303 ft., Viola 4,390 ft., dolomite 4,425 ft., Wilcox 4,454 ft.

CALIFORNIA

New Deep Zone Tapped at Signal Hill

LOS ANGELES.—A new deep zone discovery at Signal Hill apparently has been made by R. W. Jerman at his 1 Victory, 24-4s-12w. This venture was completed flowing at a rate of 300 to 500 bbl. daily, but a few days after completion it was flowing at a rate of 960 bbl. daily through a 24/64-in. choke. Gravity was estimated at 32° to 35° and mud cut at 2 per cent. Producing interval is the deep De Soto Zone at 9,730-10,429 ft., total depth.

Shell Oil Co., Inc., last year discovered deep production from this zone at Signal Hill with what appeared to be a prolifically producing well. The well subsequently went to water, however, and water trouble could not be eliminated in wells drilled to the zone later by Shell and General Petroleum Corp. The main difference between Jerman's wildcat and the previous De Soto producers is that it lies on the north side of the main Signal Hill fault while the previous wells were on the south side of the fault. It is possible, therefore, that the 1 Victory will prove up a substantial accumulation, but several more wells will be required before too much interest is created. A large scale development and exploratory program is not expected since the well is too deep for widespread town-lot development and because casing is still too short for independents to drill many wells to this depth. It is reported, however, that several of the larger independents have put leases together and will do further exploratory work in the area.

Standard Oil Co. of California has reached a depth of 13,260 ft. in its deep wildcat in the Greely field of Kern County, the 12-21 Kern County Land Co., 7-29s-26e. Scheduled to go to the Eocene sands, the well is now estimated to be about 200 to 400 ft. short of its objective.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, Mountain View area: Independent Exploration Co. 16 McDonald, 18-30s-29e, pumped 70 bbl. in 14 hr., gravity 19°, water cut 5.0 per cent, elev. unknown, TD 4,651 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, McDonald Anticline area: The Mitchell Co. 2 Fee, 12-28s-19e, dry, elev. 1,041 ft., Button Bed 698 ft., Phacoides 1,472 ft., TD 1,542 ft.

Kings County, La Hacienda area: Shell Oil Co., Inc., 1 La Hacienda, 12-24s-20e, dry, elev. 201 ft., TD 5,015 ft.

Monterey County, Peachtree Bow area: The Texas Co. 1 Bingham, 26-20s-11e, dry, elev. 1,617 ft., TD 3,326 ft.

San Benito County, Sargent area: Gene Reid Exploration Co. 1 Mayo-Hollister, 16-12s-4e, dry, elev. 390 ft., TD 6,079 ft.

Santa Barbara County, Cuyama Valley area: Cuyama Trust Syndicate 1 Marilyn, 25-11n-28w, dry, elev. unknown, TD 5,960 ft.

Santa Rosa Island: Signal Oil & Gas et al 1 Soledad, dry, elev. 510 ft., TD 3,772 ft.

Olivera Canyon area: Union Oil Co. 3-28 Wickenden, 28-9n-32w, dry, elev. 1,146 ft., formation test 4,826-4,975 ft. recovered gas-cut mud with spots of tar, TD 4,975 ft.

San Luis Obispo County, Santa Margarita area: Santa Margarita Land & Cattle Co. 1 China Garden, 16-29s-13e, dry in basement, elev. 1,013 ft., top basement 2,100 ft., TD 2,410 ft.

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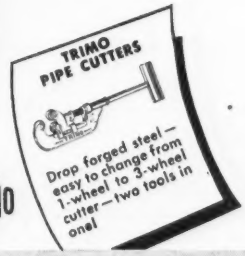

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PERMIAN BASIN

New Strawn Discovery Indicated in Survey

MIDLAND. — A new Strawn limestone discovery was indicated in north-central Scurry County this week at Placid Oil Co. 1 Davis, 6½ miles north and slightly east of Snyder. The prospector topped the Strawn at 7,018 ft. and drilled to 7,178 ft. before making a drill-stem test. After the test, operators had pulled some 4,500 ft. of drill pipe when the well started heading oil, and operations were suspended due to fire hazards. The following day the remainder of pipe was pulled, and total recovery was 2,518 ft. of high-gravity clean oil, plus 30 ft. of drilling mud. There was no formation water. Operators then drilled to 7,203 ft. and were to run another drill-stem test.

Location of the prospective discovery is 660 ft. from north and 1,980 ft. from east lines of Section 387, Block 97, H&TC Survey, and about 3 miles east and 2 miles south of Standard Oil Co. of Texas 1 Brown, recent discovery of Dermott field. The 1 Brown was completed in the Reef, or Canyon limestone.

In northeastern Scurry County, Sun Oil Co. and Ohio Oil Co. 1 Sally Helms, Section 636, Block 97, H&TC Survey, ran a 1-hour drill-stem test from 6,688-6,708 ft. which recovered 120 ft. of slightly gas-cut mud. A second test from 6,732-42 ft., open 1 hour, recovered 105 ft. of slightly gas-cut mud. It drilled to 6,838 ft. and prepared to make a third test.

In Coke County, Humble Oil & Refining Co. 1 R. E. Hickman, second well for Bronte field, came up to all expectations on production tests. Early last week it was allowed to flow into pits for 3 minutes to clean, then was turned into storage, gaging 18 bbl. of 45.8°-gravity oil. Size of choke was not reported. On completion tests it flowed 131 bbl. of oil in 6 hours, through ¼-in. choke, to rate a daily potention of 524 bbl. Gas-oil ratio was 208 cu. ft. Perforations are in the Palo Pinto limestone from 4,350-68 ft. Humble was expected to stake its second location ¼ mile east of the 1 Hickman.

In Tom Green County, Plymouth Oil Co. 1 Wiley Green, 15 miles southeast of San Angelo, was reported to have flowed 50½ bbl. of oil in 10 hours, from the Strawn limestone from 4,724-54 ft., total depth. The flow was through ¼-in. choke, which clogged with mud after the eleventh hour. After removing the choke, flowing continued through open tubing, gaging from 10-15 bbl. an hour. There was no water and gas-oil ratio was estimated at 300 cu. ft. Top of the Strawn was 4,570 ft., on an elevation of 2,124 ft. Operators were to continue testing. The well had not been acidized on last report, having kicked off to flow after the swab had been pulled 15 times.

In Schleicher County, Skelly Oil Co. 1 Mary L. Jackson, Section 41, Block LL, 2 miles northwest of Eldorado, reported flowing oil on a drill-stem test of the Strawn. Tested from 4,072-91 ft., gas came to the surface in 10 minutes, and oil in approximately 3 hours. It made a 5-bbl. flow of oil in 40 minutes and died. Fifty minutes later the flow resumed, making 4 bbl. of oil in 15 minutes. The oil tested 38° gravity. It was to drill deeper and continue testing.

In Andrews County, Sinclair Prairie Oil Co. 2-154 University, Section 24, Block 13, University Lands, Ellenburger discovery in Shafter Lake field, completed for 1,140 bbl. of 42.9°-gravity oil daily, through open 2-in. tubing after perforating from 11,685-11,750 ft. Gas-oil ratio was 300 cu. ft. Location is some 6 miles southeast of Ellenburger production in the Fullerton areas.

In Borden County, H. L. Hunt 1 Clayton & Johnson, 5½ miles south of Gail, had prospects of commercial production in the lower Permian. Drilled to around 8,015 ft., it plugged back and set casing at 6,598 ft. Perforating and acidizing from 6,490-6,520 ft. resulted in swabbing some 8 bbl. of oil an hour. Oil tested 35° gravity, and there was no water. Rotary rig was being moved off to install a pump for completion tests. Location of the well is in the SW NW Section 24, Block 31, T-4n, T&P Survey. According to reports, Hunt's next test will be 11 miles northwest of Gail, which will be the 2 Clayton & Johnson, in Section 22, Block 31, T&P Survey.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCAT

Dawson County: Tide Water Associated Oil Co. 1 Everett Turner, Sec. 2, Blk. C-39, PSL Sur., 1½ mi. NW Welch, pumped 60 bbl. 30°-grav. oil a day, San Andres 4,888-4,921 ft., TD 5,061 ft., elev. 3,131 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Dawson County: E. E. Reigle 1 Ina Mae Farley, Sec. 12, Blk. M. ELRR Sur., 2 mi. SE Welch field, dry, TD 5,025 ft., show oil in San Andres 4,915-30 ft., elev. 3,131 ft.

Mitchell County: Seaboard Oil Co. 1 C. C. Thompson, Sec. 76, Blk. 27, T&P Sur., 7 mi. SW Colorado City, dry, TD 7,715 ft., San Andres 1,330 ft., Glorietta 1,960 ft., Clearfork 2,200 ft., Ellenburger 7,630 ft., elev. 2,062 ft.

Sterling County: The Texas Co. 1-H George C. Fraser, Sec. 13, Blk. 31, T&P Sur., dry, TD 5,555 ft.

Upton County: Frank & George Frankel 1 University of Texas 312, Sec. 5, Blk. 15, University Lands, dry, TD 2,840 ft., Yates 1,560 ft., Grayburg 2,654 ft., elev. 2,390 ft.

SOUTHEAST NEW MEXICO

HOBBS.—Continental Oil Co. announced a wildcat discovery 10 miles south of Hobbs, Lea County. The well, 1 Warren Unit B-29, flowed 89 bbl. of oil on drill-stem test of the lower McKee sand between 8,961 and 9,055 ft. Total depth is 9,070 ft. The well is located in 29-20s-38e, in a 5,120-acre block owned by Continental and the partners and operated by Continental.

Eddy County. — Magnolia Petroleum Co. was ready to start rotary drilling at its 2 Burro Hills unit, 3,000-ft. Glorietta test in 23-21s-22e. Magnolia's 1 Golden, 29-21s-22e, was drilling below 2,580 ft.

Lea County.—In the Crossroads area, Magnolia 1-C Santa Fe-Pacific, 26-9s-36e, was drilling in chert at 11,770 ft. Mid-Continent Petroleum Corp. 1 Sawyer, 27-9s-36e, ran a 30-minute drill-stem test in the Mississippi section from 11,310-436 ft., recovering 90 ft. of drilling mud plus 2,000 ft. of water blanket, with no shows. Skelly Oil Co. 1 Sawyer, 33-9s-36e, was drilling below 11,730 ft. Tentative top on the Mississippi was 11,640 ft. Mid-Continent 1-B Sawyer, 34-9s-36e, was below 11,710 ft.

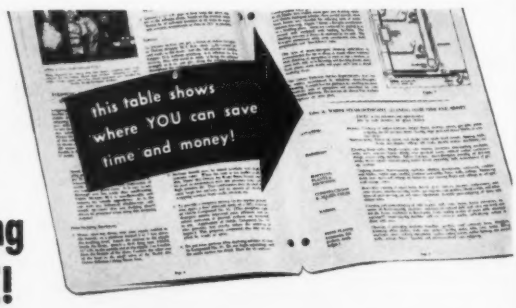
Amerada Petroleum Corp. 1-C-N-A State, 33-15s-32e, recovered drilling mud with no shows, on a drill-stem test in Yates sand at 2,569-2,690 ft. It drilled ahead. Phillips Petroleum Co. 1 Shipp, 20-18s-37e, was drilling in dolomite at 7,687 ft. Northeast of production in the Eunice-Monument area, The Texas Co. 1 McMillan, 3-19s-37e, was drilling ahead at 6,606 ft. after a drill-stem test from 6,144-64 ft. recovered 15 ft. of mud.

Stanolind 1-U State, south of the Hobbs pool in 2-20s-38e, recovered 90 ft. of drilling mud, 180 ft. of salt water and 1,000 ft. of water blanket on a 1-hour drill-stem test at 9,594-9,624 ft. It drilled ahead below 9,640 ft. Top of the Simpson was 9,310 ft., with top of the McKee sand at 9,604 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: Humble Oil & Refining Co. 1 Gorman-Federal, NE NE 30-15s-22e, dry, TD 5,849 ft., Glorietta 980 ft., Yates 1,080 ft., Clearfork 1,740 ft., Abo 3,190 ft., Ellenburger dolomite 5,528 ft., pre-Cambrian 5,750 ft., elev. 4,168 ft.

Phillips Petroleum Co. 1 Yates, NE SE 24-13s-31e, dry, TD 3,101 ft., Yates 2,290 ft., red sand 3,065 ft., elev. 4,394 ft.



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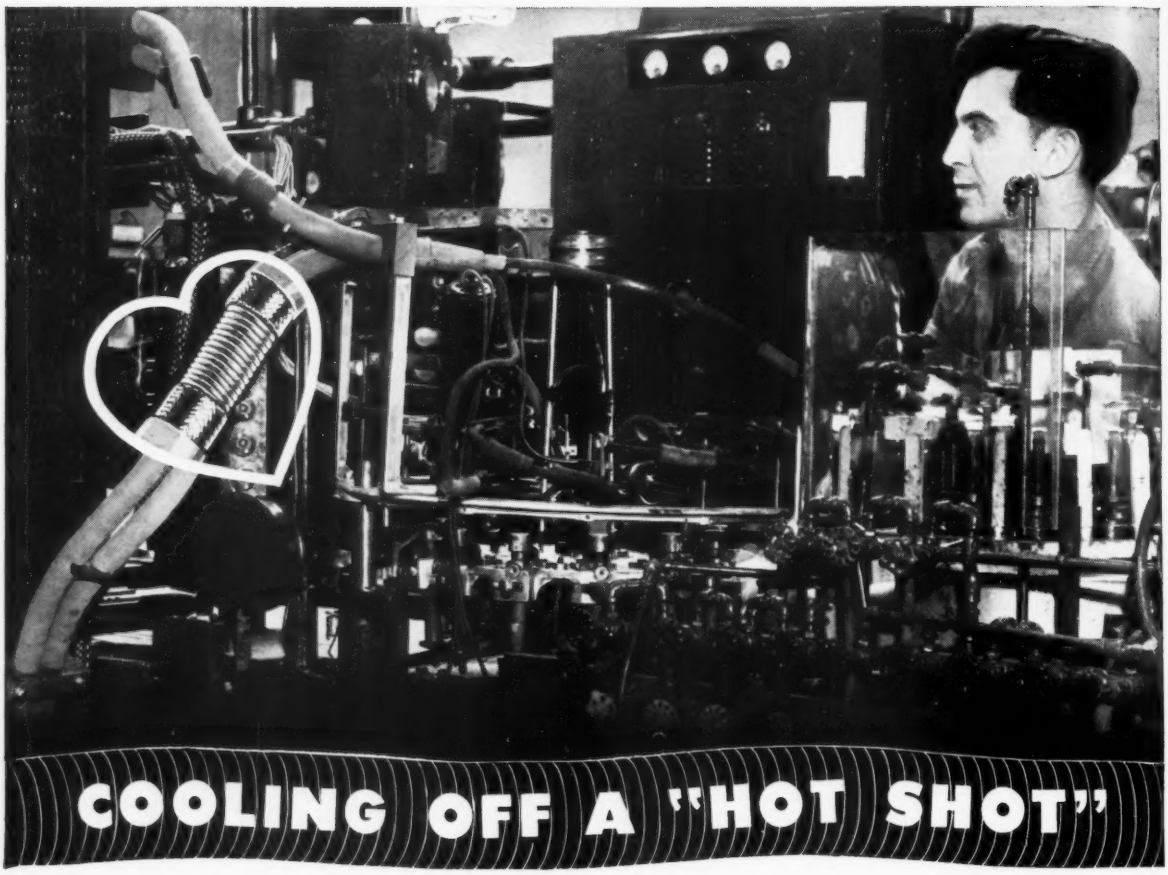

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ROCKY MOUNTAIN

Pure's New Pay Flows 2,150 Bbl.

DENVER.—On a 24-hour test, Pure Oil Co.'s West Poison Spider Mesa Verde (upper Cretaceous) formation new pay discovery flowed 2,150 bbl. of 45°-gravity oil through ½-in. choke. The well flowed with 200 psi. back pressure on tubing. Production is from a sand between 9,230-88 ft., total depth, approximately 2,000 ft. below the top of the Mesa Verde. There is approximately 500 ft. of Mesa Verde yet to be drilled. This well, the 2 Unit, C NW NW 11-33n-84w, Natrona County, Wyoming, is the first to find commercial production from this formation in the Rocky Mountain region. Pure is continuing tests, using reduced chokes, for a check of back pressure prior to determining the productive rate. Before making the test the operator ran approximately 5,000 ft. of 5-in. casing in the annular space between the productive string and tubing, in order that hot oil may be circulated if paraffin settles in the tubing. Some paraffin difficulties have been encountered in the discovery well in this field, ½ mile southeast of the present test, which was completed in the Frontier formation at 14,309 ft., total depth, 6 months ago. Pure has a 15,873-acre unit in this area, and did seismic work prior to drilling the first well.

An apparent new discovery for Wyoming is now being tested by Seaboard Oil Co. and Husky Refining Co. at the 1 Government, NW NE SW 2-44n-96w, on the Little Sand Draw structure, Hot Springs County, Wyoming. The well made 4,770 ft. of oil and gas-cut mud, with no water, on a 2-hour drill-stem test in the Embar between 5,861-5,905 ft. Gravity of the oil is 30°, asphalt base. The Embar was topped at 5,831 ft. and on a test between 5,833-62 ft., the well made 330 ft. of oil-cut mud in 1 hour. Shut-in pressure on the first test was 1,300 psi. The core between 5,862-5,905 ft. showed 43 ft. of soft, brown, well-saturated dolomite and limestone. The operator is now coring below 5,915 ft. and will probably run casing through the Embar for a test of the Tensleep, and plug back for completion if the Tensleep is not productive. The Little Sand Draw structure lies between the Golden Eagle field, where Phillips Petroleum Co. and R. S. Shannon et al are now drilling a deep test, and Gebo field. A shallow test was drilled to the Frontier at Little Sand Draw several years ago, but the structure has not previously been tested below the Frontier.

Gas flowed immediately and 11 bbl. of oil was recovered on drill-stem test in the Madison at Argo Oil Corp.'s 41 placer, SE NE SE 14-44n-98w, in the Hamilton Dome field, Hot Springs County, Wyoming. This is the first well on top of the structure to be drilled below the Tensleep formation, and the discovery of oil in the Madison in this well is of importance from a reserve standpoint in this area. Top of the Madison was found at 3,105 ft., and the test was made with total depth at 3,407 ft. There is approximately 150 ft. of Madison yet to be drilled and the operator will probably acidize and complete the well in this new pay horizon. The top of the lime was hard and tight, and on drill-stem test at 3,171-3,267 ft. the well made only 190 ft. of oil-cut mud in 1 hour. Production was first discovered at Hamilton Dome in 1918, with a well in the Chugwater formation between 1,445-1,500 ft. In 1919, oil was discovered in the Embar lime at around 2,400 ft., and in 1929, Tensleep oil was discovered. Development was retarded due to poor market for the black oil, but during recent years an active drilling program has been carried on in the field. Production in the field has exceeded 10,000 bbl. daily during the past summer. Argo and Empire State Oil Co. control the majority of acreage on the structure.

On drill-stem test in the Madison at its 9 Unit, SW SW NW 14-32n-95w, in the Sand Draw field, Fremont County, Wyoming, Sinclair Wyoming Oil Co. recovered 5,520 ft. of clear water. The well is now shut down at 8,169 ft., total depth, waiting on orders. Top of Madison was logged at 8,085 ft. and oil staining was found in the top of the formation. Casing was cemented at 8,126 ft. prior to the test, and it is probable that the well will be plugged back as a producer in the Tensleep sand. Sinclair has gas production in the Frontier and Sundance formations and oil in the Tensleep in this field, and the present well is the first to be drilled below the Tensleep.

Casing has been cemented at the second well in the Ashley Valley field, Uinta County, Utah, and the Can-Griffith Oil Co. is preparing to test the well. The well is a southeast offset to the Weber sand (Pennsylvanian) discovery well in this field, which was recently completed by Equity Oil Co. The current well, the 1 Hall, NW SE SW 23-5s-22e, found the Weber at 4,088 ft., 51 ft. higher than in the discovery well.

MONTANA SUCCESSFUL WILDCAT

Big Wall, Musselshell County: The Texas Co. 1 Zoerb, SE NW SE 18-10n-27e, flowed 75 bbl. of oil per day through 12/64-in. choke from lower Amsden, perf. 2,817-20 ft. with 30 holes, first Cat Creek 1,505 ft., Kootenai 1,610 ft., second Cat Creek 1,615 ft., third Cat Creek 1,870 ft., Morrison 1,950 ft., Ellis 2,155 ft., Chugwater 2,410 ft., Amsden 2,448 ft., Amsden sand 2,818 ft., Otter 3,255 ft., Kibbey 3,503 ft., 7-in. casing 2,930 ft.

MONTANA WILDCAT FAILURES

Little Sandy, Choteau County: Utah Southern 1 Mike La Buda, NW SW SE 20-27n-13e, dry, TD 620 ft., Eagle 412 ft., Virgelle 536 ft., water 593 ft.

Flat Coulee, Liberty County: A. B. Cobb & Co. 1 Millem, NW NE NW 15-37n-5e, dry, TD 5,149 ft., Madison 2,849 ft., basal anhydrite 3,703 ft., Devonian 3,610 ft., Cambrian 4,825 ft.

WYOMING WILDCAT FAILURE

Sheep Creek, Fremont County: Roderick Burnham 5 Gov't., SE SW NW 14-28n-92w, dry (suspended for winter), TD 2,908 ft., Embar 1,848 ft.

LA.-ARK.

Exploration Reflects Seasonal Decline

SHREVEPORT.—Wildcat operations in northern Louisiana and southern Arkansas hit a seasonal lull last week. While it is the first sign of lessened drilling this year in Louisiana, Arkansas exploration has been below its usual stride for several weeks.

Placid Oil Co. 1 Bienville Lumber Co., 9-14n-7w, Bienville Parish, was drilling ahead below 7,728 ft. It had a show of gas in the Travis Peak last week but made no further tests below 7,410-26 ft., which recovered water cushion and gas-cut mud.

In Bossier Parish, B. G. Byars 1 H. L. Skannal, 36-17n-13w, was drilling below 1,219 ft. It is a new Pettit exploration located 5 miles southeast of Bossier City. Five miles south of the Sarepta field, N. V. Kinsey 1 C. A. Antrim, 30-22n-11w, was drilling below 1,780 ft. on a Paluxy contract.

The East Haynesville area of Claiborne Parish continued to attract attention. Hunt Oil Co. 1 John R. Smith, 10-23n-7w, had drilling under way on a 11,000-ft. Smackover contract. Location is 1 miles north of production. H. W. Klein 1 A. H. Sims, between Sugar Creek and Lisbon, 34-20n-5w, was drilling in the lower Glen Rose at 5,208 ft. It had the Massive anhydrite at 4,303 ft., by samples, on elevation of 201 ft.

Hunt Oil Co. 1 Peevy, 32-15n-3w, was drilling Travis Peak at 8,918 ft. It cored hard sand with no shops at 8,887-90 ft. Sample top on the Travis Peak was 7,785 ft., on elevation of 269 ft. Southwest Gas Producing Co. 1 W. I. Burgess, 8-20n-4w, Lincoln Parish, was drilling below 4,539 ft. Projected depth is 10,100 ft. The California Co. 1 Brown Paper Mill, 10-16n-3e, ran electrical surveys to 7,050 ft. and drilled ahead. Barnsdall Oil Co. 1 Robert Sykes, Webster Parish, was to make side-wall cores, Total depth was 11,592 ft.

Drilling reports on exploratory wells in Arkansas included the following: Lion Oil Co. 1 Story, 20-18s-19w, Columbia County, drilling below 6,478 ft. in the Cotton Valley. Formation tops have not been reported below the Nacatoch at 1,967 ft. and the Saratoga at 2,247 ft. McAlester Fuel Oil Co. 1-A C. F. Tatum, new Smackover test in 23-15s-23w, Lafayette County, set casing to 776 ft. and was waiting on cement. The Palmer Oil Corp. 1 J. A. Thomas, 15-16s-23w, recovered 270 ft. of salt water on a 30-minute drill-stem test of the Glen Rose at 3,735-60 ft. Total depth was 4,007 ft. Operators planned to take side-wall cores. Stanolind Oil & Gas Co. 1 Union Saw Mill, 18-19s-24w, attempted five drill-stem tests between 9,478-9,504 ft., all of which failed. It was to make another try. Plugged back depth was 9,500 ft., from 11,440 ft.

ARKANSAS WILDCAT FAILURES

Ashley County: Superior Oil Co. 2 Bradley, SE SE 2-19s-10w, dry, TD 6,060 ft., Cotton Valley 3,606 ft., Smackover 6,049 ft., elev. 77 ft.

Columbia County: Lee & Burnett 1 Thomas, NW SE NW 4-16s-19w, dry, TD 3,600 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D.C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (b) and (c). The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The lands are on the known geologic structure of the Iron Creek field, Wyoming, and are offered in the following parcels all in T. 32 N., R. 82 W., 6th P.M.: Parcel No. 1, sec. 2, NW¼SW¼; sec 3, SE¼; sec. 10, W½NE¼, 280 acres. Parcel No. 2, sec. 11, W½SE¼; sec. 14, W½NE¼, NE¼NW¼, 200 acres. Total 480 acres. A stipulation for the protection of the Kendrick Reclamation Project (Form 4-467c), a copy of which may be obtained from the District Land Office at Cheyenne, or the Bureau of Land Management, Washington 25, D.C., will be made a part of any lease covering Parcel No. 2. Bids must be submitted on or before 1 p.m., December 22, 1948, and must be submitted on each parcel separately, but no objection will be made to the award of both parcels to the same successful bidder. Marion Clawson, Director.

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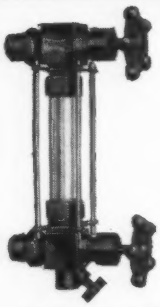

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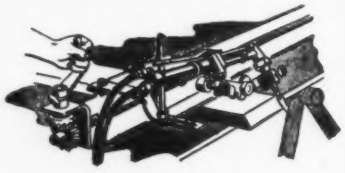

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G. H. Vaughn 1 Dennis, SW SW NW 7-16s-21w, dry, TD 7,234 ft.

Dallas County: J. F. Stone 1 H. E. Walsh, NE NE SE 33-8s-15w, dry, TD 2,443 ft.

Nevada County: Hassie Hunt 1 Nels Danielson, NE SW 30-14s-20w, dry, TD 6,113 ft., James 3,105 ft., Travis Peak 3,368 ft., Smackover 5,763 ft., elev. 352 ft.

Ouachita County: Bert Fields 1 Loda, NW NW NW 27-13s-18w, dry, TD 3,825 ft., Travis Peak 2,130 ft., Cotton Valley 2,747 ft., Smackover 3,690 ft., elev. 142 ft.

OHIO, KENTUCKY

Frazeyburg Area Gets Second Gas Well

COLUMBUS.—Fred Beasley et al's second completion north of Frazeyburg proved better than the discovery well. Their 1 Ida C. Spencer, Lot 12, Jackson Township, Muskingum County, topped the Clinton at 3,252 ft. and finished at 3,307 ft. with a natural open flow of 2,162,000 cu. ft. of gas with 1,050 psi. They plan an offset on McDonald, on the south.

The Belden Co. moved ½ mile north of its discovery well in the south part of Bethlehem Township, Stark County, and brought in a good well on C. S. Baker in Section 14. White Clinton at 4,448-85 ft. gaged 1,902,000 cu. ft. of gas which was tubed without shooting.

The Altier Brothers completed a two-sand well in the south part of the Sayre pool, the 1-C Nicholas Altier, Section 10, Bearfield Township, Perry County. Clinton sand at 3,803-39 ft. made 400,000 cu. ft. of gas and the Medina at 3,904-10 made an additional 1,200,000 cu. ft. natural.

W. C. Best extended the Parma pool to the southwest with an Oriskany well on Arnold Schroeder, Section 11, Royalton Township, Cuyahoga County. The sand came in at 1,766-1,836 ft. and gaged 520,000 cu. ft. of gas natural and 829,000 cu. ft. when shut in after shot.

The Preston Oil 3 H. E. Smith, Section 28, Hopewell Township, Perry County, flowed and swabbed 87 bbl. in the first 24 hours after shot.

EASTERN KENTUCKY

ASHLAND.—On Laurel Creek dome in northwestern Johnson County, Ashland Oil & Refining Co. is drilling at 375 ft. at the 8 Wallace Williams, 19-R-79, 12 miles north of Paintsville. The test is a rank wildcat designed to test upper measures of the Knox dolomite.

In Lee County, 19-N-69, Jack Kindred is drilling at 2,550 ft. on the 1 C. J. Sipple with the Knox dolomite objective expected in the next several hundred feet. This be the second well in the county to reach this formation, the other being a hole drilled by Floyd Fitch some years ago.

On Caney anticline at the town of Cannel City, 12-P-65, Sam Allen et al are drilling at 4,361 ft. on the 1 Thomas Richardson. Previously the St. Peter formation had been topped at 4,182 ft., and Knox dolomite at 4,261 ft. To date only a small show of gas and a small show of water have been reported in this important exploratory test.

WESTERN KENTUCKY

OWENSBORO.—The area within the village of Cairo in Henderson County attracts interest again as Aurora Gasoline Co. and Delta Drilling Co. begin tests at 1 W. J. Mills, 14-O-23. A 1-hour drill-stem test of the Waltersburg at 1,783-92 ft. recovered 200 ft. of oil and 35 ft. of oil-cut mud with no water. Carter Oil Co. opened North Cairo pool in May of this year with production of 110 bbl. per day from the Waltersburg at 1 A. E. Melton, NE SW NE 14-O-23. This is just east of the village but north of production in Cairo pool.

In the Guffie area of McLean County, Miller & Shiarella and Ashland Oil & Refining Co. have completed 3 Wiggins et al, 19-N-27, with an initial production of 75 bbl. per day from the Tar Springs at 1,639-52 ft. and from the Hardinsburg at 1,745-54 ft. Total depth is 2,020 ft.

INDIANA

EVANSVILLE.—The area in Vanderburgh County that is south of Vienna pool has prospects for new O'Hara production. W. O. Morgan is running casing at 1 Walter Boeke, NW NW SE 6-6s-11w. A 1-hour drill-stem test of the O'Hara at 2,595-2,609 ft. recovered 1,450 ft. of oil and 30 ft. of mud. The well is about ¾ mile west of South Vienna pool which was opened in August with production in the Aux Vases.

The area in southwestern Posey County east of College pool continues to attract interest as Carter Oil Co. 1 Hastings, SE SE NE 11-8s-14w, shows for another good McClosky well. The pay at 2,860-66 ft. was treated with 5,000 gal. of acid and on last report, swabbed and flowed 627 bbl. per day. The area was opened early in November by V. R. Gallagher et al 1 Spencer-Vogel, with initial production of 1,178 bbl. per day from the McClosky. The new well is a southwest offset to the discovery well.

INDIANA SUCCESSFUL WILDCAT

Posey County: Coy Oil Co. 1 P. A. Lynch, NW NE NE 26-7s-15w, IP 35 bbl., Cypress 2,460-79 ft., TD 2,481 ft.

INDIANA WILDCAT FAILURES

Marshall County: W. E. Adams 1 G. Apple, SW NE NW 21-34n-2e, dry, TD 250 ft.

Spencer County: Ellis et al 1 O. C. Snyder, NE NE NE 19-8s-6w, dry, TD 1,756 ft.

Sullivan County: H. A. Seipman 1 J. R. Cox, NW SW SE 25-9n-8w, dry, TD 2,110 ft.

Vanderburgh County: George & Wrather et al 1 Blankenberger, SE SW NW 20-4s-11w, dry, TD 2,640 ft.

Shamrock Buys Panhandle Eastern Natural Gas

Arrangements have been made by Shamrock Oil & Gas Co., Amarillo, Tex., to purchase all production of natural gasoline from Panhandle Eastern Pipe Line Co. at their plant north of Liberal, Kans. Shamrock has begun construction of a blending, loading and marketing plant on Panhandle property.

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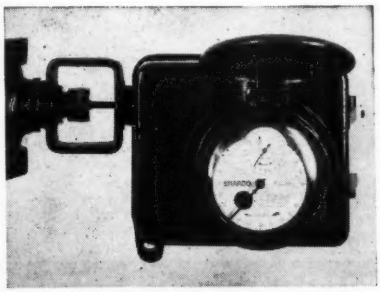

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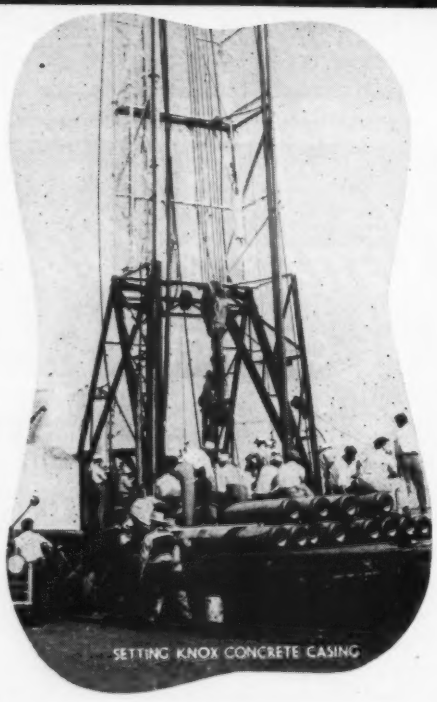
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Natural Gas, Tidelands Are Topics of Compact

(Continued from page 54)

action if they are not corrected voluntarily. He referred to the varying definitions of a thousand cubic feet of gas, brought about by different density and pressure bases, and particularly to different prices paid throughout the state for gas because of the fact that some contracts were made at times of oversupply and few market outlets.

There is no reason why, when a barrel of oil is considered to have the same value at any well in the state, a thousand cubic feet of natural gas should not be so considered, Carlson declared, calling on the natural-gas industry to correct such inequities or be faced with legal compulsion to do so.

Attempts of the Federal Power Commission to regulate production of natural gas was also denounced by the speaker. He cited a current instance in which FPC is endeavoring to prevent an interstate pipe-line company from forming a production company to develop acreage in Hugoton field to sell gas to citizens of Kansas, and said "the State of Kansas is not pleased with the inference that it cannot properly and adequately take care of its own business in so far as conservation of oil and gas are concerned."

New Mexico Plans Law

Responding to the address of welcome, Hiram M. Dow, official representative of New Mexico, announced that a bill to control conservation and ratable take of natural gas will be one of the principal matters before the legislature of his state which convenes next month, and he predicted that his state soon will have a regulatory system similar to those of Kansas and Texas.

Calling for support of all state governments for legislation affirming state control of offshore oil, Governor Jester described the tidelands issue as the kick-off to nationalization of all natural resources. Since the Supreme Court decision in the California case declaring that the federal Government has paramount rights in offshore oil superior to those of a mere title owner, Jester said, there have been other court decisions indicating that the states do not own and cannot regulate conservation of fish and marine life within their waters and a recent South Carolina case indicates that federal control of inland water resources is imminent unless congressional action is obtained.

Jester analyzed the forces working for and against state regulation and predicted that the tidelands issue eventually will be resolved in favor of the states.

There is a very definite trend in both Congress and state legislatures toward laws fixing a minimum price for natural gas as a conservation measure, it was declared by Rep. Ross Rizley of Oklahoma in an address on legislative trends in gas conservation.

He added that price fixing by legislation for any purpose is undesirable and urged the industry to avoid this by revising its purchase contracts to provide a satisfactory field price for gas.

Rizley traced the history of efforts of the Federal Power Commission to extend its jurisdiction into production of natural gas and the unsuccessful effort to amend the Natural Gas Act in the last Congress. He cited a number of recent developments to show that this effort is continuing, thus making new legislation still more imperative from the standpoint of the producing states, though he said that in some recent decisions the courts have given a strict construction to FPC's powers and have warned it to go to Congress instead of to the courts if it feels its statute is insufficient for its purposes.

Among the technical papers on gas conservation presented at the Compact Commission meeting were "Storage of Gas as a Conservation Measure," by H. J. Wagner, engineer director of the Public Service Commission of West Virginia; "The Conservation of Natural Gas and Secondary Recovery," by Prof. George Fancher of the University of Texas; and "Progress in Evaluating the Function of Natural Gas in the Production of Oil," by H. H. Kaveler.

Interior Takes Over Land To Prevent Oil Drainage

WASHINGTON.—The Interior Department last week took over from the Federal Works Agency jurisdiction over a tract of land located in Long Beach, Calif., "to prevent loss to the United States by reason of the drainage or threatened drainage" of oil and gas deposits by wells on privately owned adjacent lands.

The land comprises six lots bounded by American Avenue, Roble Way, Alamo Court, and Third Street, and was originally acquired by the Government as the site for the Long Beach post office.

For the same reason, the department also took over land acquired for Naval Auxiliary Airfield No. 55 at Corpus Christi, Tex., comprising 221.5 acres.

Oil Supply and Demand Are Balanced, Says Friedman

WASHINGTON. — Barring unforeseen developments of the first magnitude, petroleum supply and demand will be adequately balanced for at least 12 months to come, Robert E. Friedman, acting director of the Oil and Gas Division, advised Sec. J. A. Krug last week.

THE OIL AND GAS JOURNAL

"Yeah, I know—but he can't hit a thing without it"

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED DECEMBER 11, 1948

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	24	12	0	*12	24,100	1,409	1,674	0	0	0	0	0	0	0	0	0	0
Pennsylvania	42	18	6	†18	73,714	2,410	2,999	0	0	0	0	0	0	0	9	14	23
West Virginia	14	1	12	1	46,312	785	837	0	0	0	0	0	3	0	37	43	83
Ohio	33	9	12	12	76,883	1,332	1,310	0	0	0	0	0	2	0	11	36	49
Indiana	19	8	0	11	34,842	1,059	622	1	0	0	4	5	28	0	1	98	127
Kentucky	8	5	0	3	10,341	755	707	0	0	0	0	0	10	0	0	41	51
Illinois	61	32	1	28	153,089	2,395	2,005	0	0	0	5	5	47	0	2	366	415
Michigan	15	8	0	7	30,805	838	865	1	0	0	4	5	19	0	10	256	285
Kansas	75	35	2	38	249,181	2,996	2,597	1	0	0	7	8	61	0	7	422	490
Neb., Mo., Iowa	0	0	0	0	0	9	5	0	0	0	0	0	0	0	0	7	7
Oklahoma	85	53	8	‡24	313,274	4,002	3,854	3	0	1	8	12	126	8	28	598	760
Texas	286	166	14	106	1,174,894	11,490	8,812	5	1	3	43	52	318	35	100	1,963	2,416
North Central (Dist. 7-B & 9)	100	45	0	‡55	264,097	3,602	2,743	2	0	0	14	16	115	3	13	716	847
West (Dist. 7-C & 8)	71	61	0	10	370,855	3,060	2,156	1	0	0	5	6	66	1	6	225	298
Panhandle (Dist. 10)	17	12	3	2	54,389	625	462	0	0	0	0	0	1	0	3	11	15
Eastern (Dist. 5 & 6)	25	14	5	6	130,287	582	555	0	0	0	5	5	12	2	1	117	132
Gulf Coast (Dist. 2 & 3)	30	14	3	13	185,866	1,795	1,490	0	1	2	8	11	72	24	37	415	548
Southwest (Dist. 1 & 4)	43	20	3	20	169,400	1,826	1,406	2	0	1	11	14	52	5	40	479	576
Louisiana	55	35	5	15	288,962	2,217	1,539	2	1	0	7	10	48	26	9	210	293
Northern	29	23	4	2	57,170	1,482	914	0	0	0	0	0	4	4	2	102	112
Southern	26	12	1	13	231,792	735	625	2	1	0	7	10	44	22	7	108	181
Arkansas	16	6	0	10	69,102	295	310	0	0	0	6	6	6	0	0	90	96
Mississippi	16	6	1	9	138,692	403	465	0	1	0	8	9	4	2	3	99	108
Southeastern States	0	0	0	0	0	51	61	0	0	0	0	0	0	0	0	47	47
Montana	10	7	1	2	21,968	301	292	1	0	0	2	3	5	0	0	26	31
Wyoming	5	4	0	1	20,518	555	252	0	0	0	1	1	26	0	2	74	102
Colorado-Utah	0	0	0	0	0	211	103	0	0	0	0	0	3	0	5	45	53
New Mexico	13	9	1	3	56,543	566	516	0	0	0	2	2	5	1	3	54	63
California	56	47	0	9	191,975	2,729	1,926	1	0	0	8	9	115	1	5	335	456
Total United States	833	461	63	309	2,975,195	36,808	31,851	15	3	4	105	127	826	73	232	4,824	5,955
Total previous week	790	457	50	283	2,856,298	35,975	31,094	15	2	3	123	143	811	70	228	4,719	5,828
Total December 13, 1947	757	402	81	274	2,560,436			7	0	6	91	104	658	88	215	3,941	4,902

Service wells included: *12, †16, ‡2.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Gravity—	Signal Hill, Calif.	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Effective September 28, 1948, Phillips Petroleum Co. advanced prices 35 cents per barrel over those shown in above table in fields where it buys. Sinclair Prairie Oil Co. met Phillips' increase effective November 24 in all fields that it buys and extended price advance to some Rocky Mountain fields. Advances have not been generally met.

A.P.I. REFINERY REPORT, WEEK ENDED DECEMBER 4

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	887	2,355	284	1,268	1,735	22,440	11,286	26,986	12,726
Appalachian:									
District 1	108	289	54	77	75	2,521	416	999	412
District 2	69	269	32	49	100	1,213	134	274	241
Ind., Ill., Ky.	965	3,396	418	1,030	1,057	19,554	4,708	12,873	5,869
Okla., Kans., Mo.	441	1,691	160	531	523	9,210	1,603	6,079	3,013
Inland Texas	236	1,094	84	151	435	3,338	676	1,231	1,294
Texas Gulf Coast	1,387	4,279	799	2,213	1,761	15,988	3,603	14,296	11,267
La. Gulf Coast	475	1,409	461	686	534	5,350	2,341	3,781	3,787
N. La. and Ark.	93	259	60	90	132	2,188	592	924	326
Rocky Mountain:									
New Mexico	14	52	7	12	27	66	25	53	33
Other Rocky Mtn.	141	463	39	183	217	1,959	254	1,686	1,135
California	882	2,660	92	979	2,301	11,408	899	14,811	46,278
Dec. 4, 1948	5,698	18,216	2,490	7,269	8,897	95,235	26,537	83,993	86,381
Nov. 27, 1948	5,721	17,317	2,630	7,476	9,477	93,802	26,569	85,151	86,192
Dec. 6, 1947	5,269	16,051	2,113	6,525	8,749	86,968	19,273	58,241	55,556

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 233,932,000 bbl. as of December 4—down 653,000 bbl. One year ago 222,438,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas‡	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.50
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above. ‡Phillips and Sinclair and other companies meeting 35-cent advance, $3.00.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

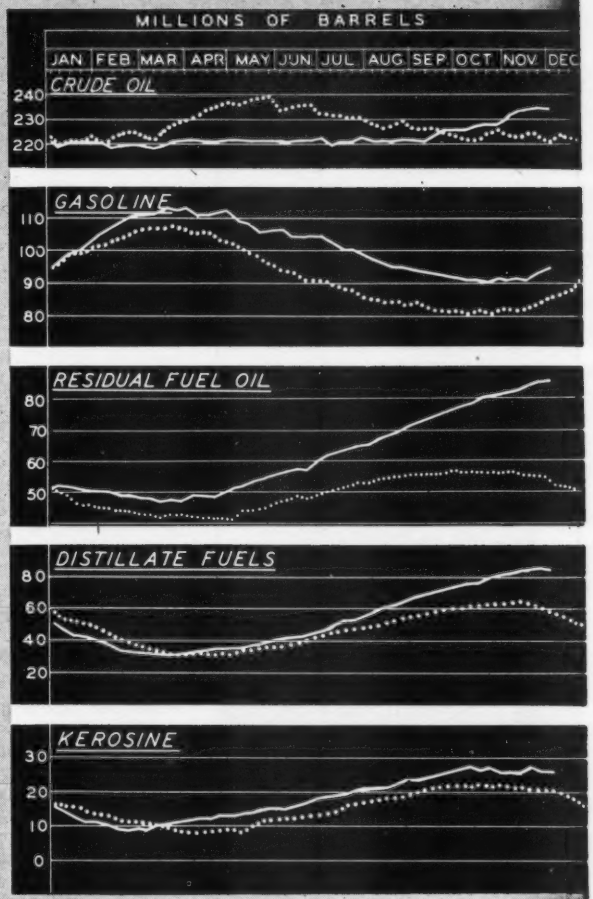
	Dec. 11 crude oil	B. of M. Nov. demand	Dec. 4 crude oil
Alabama	1,250	1,500	1,250
Arkansas	81,700	88,000	80,850
California	955,000	960,000	954,000
Colorado	52,290	48,000	48,150
Eastern	62,000	65,300	60,750
Florida	875	1,000	525
Illinois	178,400	167,000	178,700
Indiana	24,000	71,500	25,100
Kansas	299,900	306,000	291,800
Kentucky	24,200	23,000	24,100
Louisiana	494,800	500,000	492,200
North Louisiana	115,800	.....	113,350
South Louisiana	379,000	.....	378,850
Michigan	45,200	45,000	48,100
Mississippi	130,600	131,000	129,650
Montana	26,430	26,000	25,420
Nebraska	350	750	350
New Mexico	134,380	134,000	134,480
Oklahoma	439,400	436,000	443,000
Texas	2,515,675	2,460,000	2,519,175
Dist. 1 (Southwest)	27,935	.....	27,800
Dist. 2 (Southwest)	179,150	.....	178,625
Dist. 4 (Southwest)	250,200	.....	252,275
Dist. 3 (Gulf Coast)	503,090	.....	503,600
Dist. 5 (Eastern)	51,725	.....	51,750
Dist. 6 (Eastern)	124,875	.....	124,875
East Texas field	289,000	.....	292,650
Dist. 7-C (West)	50,425	.....	49,750
Dist. 8 (West)	743,225	.....	744,775
Dist. 7-B (W. Central)	62,350	.....	60,450
Dist. 9 (N. Central)	144,600	.....	143,700
Dist. 10 (Panhandle)	89,100	.....	88,925
Wyoming	162,410	150,000	156,590
Total United States	*5,628,860	5,560,000	5,614,190
Change from prev. wk.,	up 14,670		

Total production January 1-December 11 †1,882,990,470 bbl.
Same period last year (crude plus cond.) 1,750,642,390 bbl.

*Not incl. 80,355 bbl. condensate. †Incl. 25,838,870 bbl. condensate.

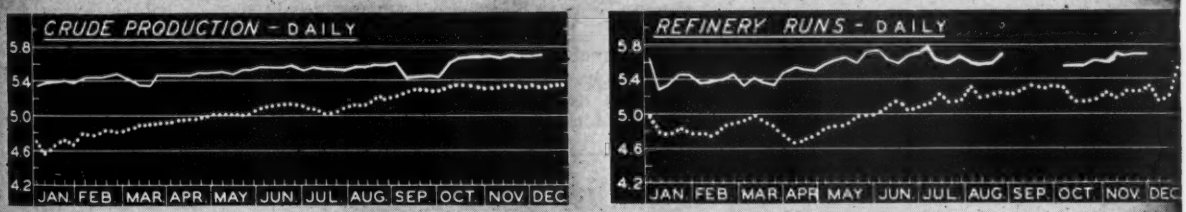
STOCKS IN UNITED STATES

---- 1947 ——— 1948



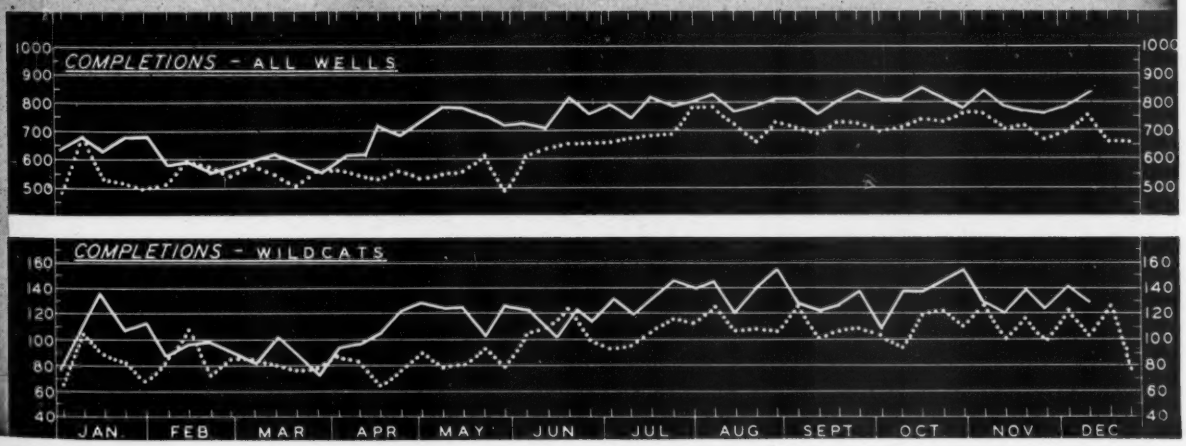
DAILY OPERATIONS

---- 1947 ——— 1948



WEEKLY COMPLETIONS

---- 1947 ——— 1948



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EJECTORS

Use the power of steam, air or water under pressure to lift liquids. Being simple jet pumps they have no moving parts and require no lubrication. A variety of models to meet different conditions. Also used as water heaters.

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THE OIL AND GAS JOURNAL
Box 1260 Tulsa 1, Okla.

MARKETS

FURTHER evidence of continued easing in both the crude and products markets was indicated last week. The Joseph Seep Purchasing Agency of South Penn Oil Co. reduced by 50 cents per barrel its posted price for Pennsylvania Grade crude oil. New price brings Bradford, Pa., listing to $4.50 per barrel.

Effective December 11 Zanesville Pennsylvania Grade crude purchased by Valvoline Pipe Lines Co. was quoted at $3.65 per barrel, a reduction of 30 cents.

At New York Harbor one independent supplier cut prices of his No. 6 fuel oil 20 cents per barrel, bringing the low to $2.83 tank cars and $2.80 barges. The downward revision of gasoline and fuel-oil prices by Socony-Vacuum Oil Co., Inc., has been met by virtually all major oil companies throughout the New York and New England areas.

Published price quotations for spot tank-car sales, f.o.b. Group 3, dipped slightly over the past week in gasoline products.

Mid-Continent Area

Little change was noted in the past week of movement of petroleum products on the spot market in the Mid-Continent area. Some published quotations, however, for the low of tank-car prices, f.o.b. Group 3, were reduced. Regular grade motor gasoline previously posted at 10½ to 10¾ cents per gallon was dropped to 10⅜ cents on the low, and 64-67 octane, ASTM motor gasoline, formerly carried at 10⅛ to 10⅜ cents per gallon was down to 10 cents on the low quotation.

The brightest spot in the Mid-Continent market picture was seen in the continued strong demand for prime white, No. 1, and range oil, one refiner reported. Gasoline was reported moving "fair" and supply was plentiful, according to most reports. One Mid-Continent seller reported moving about 75 cars of gasoline at 10⅜ cents per gallon. This refiner also reported moving more than 50 tank cars of kerosine at 9½ cents, and that about 20 cars of No. 2 was moved at varying prices between 8¾ and 9½ cents per gallon. Movements of gasoline at prices lower than 10⅜ cents were reported by several suppliers.

New York Harbor

Socony-Vacuum last week announced another cut in its No. 5 residual fuel-oil prices at New York Harbor and at yard and retail levels in the greater New York area. Barge price at New York Harbor was lowered from $3.70 to $3.45 per barrel.

No. 2 was reported easily available for 9 cents at New York Harbor on open market barge offerings, and No. 6 was not moving even at prices from $2.55 to $2.65. Kerosine continued to be closely held, and one buyer was reported to have been unable to locate any at less than 11 cents. Another buyer, however, said that he had purchased two barge lots at 10.2 cents on the open market. One barge lot offering of "distress" No. 2 fuel oil at 8.6 cents was reported last week in the harbor area.

Gulf Coast Picks Up

After a week's lull spot-market trading picked up somewhat on the Gulf Coast. One marketer reported a "few inquiries" as contrasted to the recent period of "all quiet." Low-octane gasoline was reported to be moving in cargo transactions and prices remaining firm. Trading of fuel oil, however, was slow.

Representative Quotations

Representative spot-market quotations of leading suppliers as of December 13, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10¼-10½	11.8-12* 10.5-11.9†	10¼-11½
Premium gasoline, 78-80 octane	11-11¼	10.6-13.4	11-12¼
42-44 w.w. kerosine	9⅜-9¾	10.3-11.7	9½-10¼
No. 2 straw fuel oil	8½-9½	9.1- 9.7	9-9½
No. 6 residual	$1.60 1.75	$2.83-2.90	$2.20-2.52

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9 9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-13.5
750 vis., No. 3-4 neutral	15-16.5
2,000 No. 5-6 neutral	17-18.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	31-33
200 vis. No. 3 neutral, 0-10 pp.	19-21

Western Pennsylvania

144-155 vis. 10 p.t. bright stock	40.5
180 vis. p.t. neutral	38.5

CRUDE-SCALE WAX

Mid-Continent

132-134 A.M.P.	5½

EQUIPMENT MEN ... in the News

Lingle Directs Western Division Taylor Forge

T. J. LINGLE

Taylor Forge & Pipe Works, Chicago, has appointed Thomas J. Lingle as Western division manager in charge of manufacturing operations at its new Fontana, Calif., plant. He also will direct West Coast sales.

Lingle formerly was associated with C. F. Braun Co., Alhambra, Calif., engineers, manufacturers, and constructors of oil refineries and chemical plants. Since 1946 he has operated his own valve and fittings business in Alhambra. The Fontana plant of Taylor Forge already has begun production of spiral pipe. Forging operations will begin soon.

Regional Sales Meetings Held by Oakite Products

How recent developments in the field of cleaning and allied procedures are helping industry to combat rising production costs, was the central theme of a series of technical-sales conferences held in New York, Chicago, and Kansas City during November by Oakite Products, Inc.

The first of these regional conferences, held at Hotel Pennsylvania, New York City, incorporated a program of lectures and round-table discussions attended by field service representatives of the company's New England, New York, Philadelphia, Southern, and Canadian sales divisions.

Similar conferences held at Chicago and at Kansas City were attended by Oakite field service representatives from Chicago, Detroit, and Central divisions, and the Pacific Coast, Midwestern, and Southwestern sales territories respectively.

Badger & Sons Elect Hargrove and Waterman

G. C. HARGROVE

R. D. WATERMAN

George C. Hargrove and Ralph D. Waterman were elected vice presidents of E. B. Badger & Sons Co., Boston, at a recent meeting of the board of directors. Hargrove, who has been with the company for 18 years, is vice president in charge of general administration and sales. Waterman, who has been with E. B. Badger for 9 years, is vice president in charge of engineering and construction.

A subsidiary of Stone & Webster, Inc., E. B. Badger & Sons has a world-wide reputation for engineering, design, and construction work in the chemical, petroleum, and petrochemical industries.

G. W. Reed Selected for Manpower Committee

GEORGE W. REED

George W. Reed, foreign coordinator and director of service division, Seismograph Service Corp., Tulsa, has been appointed to serve on the Petroleum Industry Manpower Committee of National Petroleum Council.

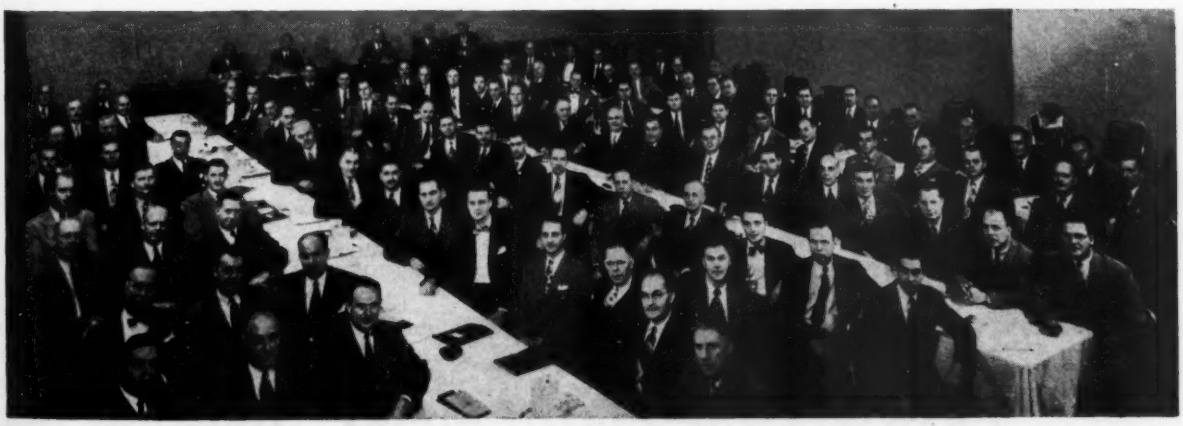
One of the functions of the committee is to study and report the adequacy of available employment data for the divisions of the domestic petroleum industry and to recommend ways and means to overcome deficiencies. W. W. Vandeveer, Cleveland, serves as chairman of the committee.

Oil Well Supply Co. Makes Appointments

Promotion of R. R. Longnecker to district engineer of production equipment for the South Louisiana-Mississippi district has been announced by F. D. Smith, Gulf Coast division manager for U. S. Steel's Oil Well Supply Co. Longnecker's headquarters will be at Brookhaven, Miss.

He served in the engineering department of the company from April 1937 until February 1941 when he entered the U. S. Army. Following his discharge in January 1946, he rejoined Oil Well Supply Co. at Ellinwood,

(Continued on page 162)



Field representatives in attendance at New York Sales Conference of Oakite

REFINERY EQUIPMENT

Immediate Delivery — Guaranteed A-1 Condition

TOWERS

1—9'x88'6"x3/4" shell x 1 3/32" head, 125# WP @ 500° F, 35 bubble trays, stress relieved, API-ASME code constructed.

1—5'6"x103'4"x1 1/2" shell x 1 1/2" head, 500# WP @ 500° F, 45 bubble trays, stress relieved, API-ASME code constructed.

1—5'x13'6"x7/16" shell x 23/32" head, 75# WP @ 500° F, 3 decks, stress relieved, API-ASME code constructed.

1—5'x44'6"x7/8" shell x 1 1/2" head, 300# WP @ 300° F, stainless steel trays, API-ASME code constructed.

1—8'7"x68'4"x1/2" shell x 9/16" head, 75# WP, 30 bubble trays, API-ASME code constructed.

VESSELS

1—4'x12'x5/8" shell x 15/16" head, 200# WP @ 250° F, stress relieved, API-ASME code constructed.

1—5'x12'6"x3/4" shell x 5/8" heads, 50# WP @ 250° F, stress relieved, API-ASME code constructed.

2—8'x30'x13/16" shell x 1 5/16" head, 150# WP @ 500° F, stress relieved, API-ASME code constructed.

3—6'10"x21'6"x .876" shell, 186# WP @ 650° F, API-ASME code constructed.

1—7'x14'x5/8" shell x 15/16" head, 125# WP @ 500° F, stress relieved, API-ASME code constructed.

6—4'6"x56'8"x13/16" shell x 1 1/4" heads, 300# WP @ 650° F, stress relieved, API-ASME code constructed.

2—4'x16'x5/8" shell x 1" head, 250# WP @ 650° F, stress relieved, API-ASME code constructed.

1—3'x12'6"x9/16" shell x 9/16" heads, 200# WP @ 500° F, stress relieved, API-ASME code constructed.

1—3'x23'x1/2" shell x 11/16" heads, 225# WP @ 650° F, stress relieved, API-ASME code constructed.

1—4'x14'x5/8" shell x 15/16" head, 225# WP @ 650° F, stress relieved, API-ASME code constructed.

1—5'x15'x7/16" shell x 11/16" heads, 75# WP @ 500° F, stress relieved, API-ASME code constructed.

1—3'x12'6"x3/8" shell x 7/16" heads, 60# WP @ 500° F, stress relieved, API-ASME code constructed.

3—7'x36'6"x1" shell x 1 5/8" head, 225# WP @ 650° F, stress relieved, API-ASME code constructed.

1—6'x23'x1" shell x 1 7/16" heads, 225# WP @ 650° F, stress relieved, API-ASME code constructed.

1—4'x20'x7/16" shell x 21/32" heads, 150# WP @ 500° F, stress relieved, API-ASME code constructed.

PUMPS

CENTRIFUGAL

1—Worthington, Type 3HR3, 300 GPM @ 504 TDH, 60 HP explosion proof motor.
1—Byron Jackson, Type SDMX, 175 GPM @ 600 TDH, 40 HP explosion proof motor.
2—Byron Jackson, Type SDMX, 155 GPM @ 910 TDH, 40 HP explosion proof motor.
2—Worthington, Type 3HR2, 267 GPM @ 308 TDH, 25 HP explosion proof motor.
2—Byron Jackson, Type 15HB, 125 GPM @ 1900 TDH, 85 HP explosion proof motor.
2—Byron Jackson, Type Q1-OO-BKM, 100 GPM @ 537 TDH, 25 HP explosion proof motor.
2—Byron Jackson, Type 2-KML, 576 GPM @ 154 TDH, 40 HP explosion proof motor.
2—Byron Jackson, Type LDV, 44 GPM @ 640 TDH, 15 HP explosion proof motor.
2—Byron Jackson, Type 2-QL-2-BMH, 470 GPM @ 785 TDH, 100 HP explosion proof motor.
1—Byron Jackson, Type LBDV, 30 GPM @ 2140 TDH, 15 HP explosion proof motor.
1—Ingersoll-Rand, Type 2MFL, 218 GPM @ 419 TDH, 40 HP explosion proof motor.
1—Ingersoll-Rand, Type 2MFL, 100 GPM @ 312 TDH, 20 HP explosion proof motor.
1—Byron Jackson, Type OOBK-VMT, 85 GPM @ 348 TDH, 7 1/2 HP explosion proof motor.
6—Worthington, Type 6SLI, 700 GPM @ 75 TDH, 20 HP explosion proof motor.
2—Worthington, Type 6 LSI, 700 GPM @ 85 TDH, 25 HP explosion proof motor.
1—Worthington, Type 9LS3, 700 GPM @ 75 TDH, 20 HP explosion proof motor.
1—Ingersoll-Rand, Type 2MFL, 200 GPM @ 410 TDH, 30 HP explosion proof motor.
1—Byron Jackson, Type 2OH12BH6, 580 GPM @ 360 TDH, 50 HP explosion proof motor.

SIMPLEX STEAM

3—7x4 1/2x10 National
1—12x8x14 National
1—14x5 1/2x12 National
1—9x7x4 National
1—9x7x12 National
2—12x7x14 National
1—5 1/2x3x7 Dean
1—12x7x12 Union

SIMPLEX STEAM (HOT OIL)

1—14x5x12 National
1—10x5 3/4x12 National Transit
1—7x3x8 Worthington
1—9x4x6 Worthington

DUPEX STEAM

1—7x3x8 Worthington

DUPLEX (HOT OIL)

1—Wilson Snyder 4 1/2x24, direct connected to Cooper-Bessemer 4 cycle engine, 400 HP.
1—Wilson Snyder, 5x12, direct connected to Cooper-Bessemer 2 cycle engine, 110 HP.

CONDENSERS AND EXCHANGERS

4—Vertical overhead condensers, 1" OD x 14 BWG admiralty tubes, 1730 sq. ft. surface each.
1—Reboiler, 3/4" OD x 14 BWG steel tubes, 850 sq. ft. surface each.
1—Heater, 1" OD x 12 BWG steel tubes, 80 sq. ft. surface.
1—Cooler, vertical section, 1" OD x 12 BWG steel tubes, 545 sq. ft. surface.
1—Vaporizer, 1" OD x 12 BWG steel tubes, 672 sq. ft. surface.
1—Bottoms Cooler, 1" OD x 12 BWG steel tubes, 1104 sq. ft. surface.
1—Reboiler, 1" OD x 12 BWG steel tubes, 490 sq. ft. surface.
1—Reboiler, 3/4" OD x 14 BWG steel tubes, 1200 sq. ft. surface.
1—Charge heater, 3/4" OD x 14 BWG steel tubes, 438 sq. ft. surface.
1—Bottoms heater, 1" OD x 12 BWG steel tubes, 45 sq. ft. surface.
1—Condenser, 1" OD x 12 BWG steel tubes, 470 sq. ft. surface.
2—Condensers, 1" OD x 12 BWG steel tubes, 3370 sq. ft. surface each.

Complete specifications and drawings available on all items.

WE EXTEND TO ALL OUR FRIENDS AND CUSTOMERS COMPLIMENTS OF THE SEASON

PETROLEUM EQUIPMENT, INC.

P. O. Box 887 Tulsa, Oklahoma — **Phone 2-6291 Thrasher Building**

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The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

USED Fort Worth Spudder, size Super-D, first-class condition every place, including new bearings and chains throughout. Will spool 4000′ of ⅞″ wire line. Machine located Okfuskee County, Oklahoma. Inquire: Ingold, Room 1307, Philtower Bldg., Tulsa, Oklahoma. Phone 2-8095.

PIPE FOR SALE: 6,000′ 8″ 24# T & C, 22,000′ 7″ 17# O.D. Casing, 40,000′ 5½″ 14# O.D. Casing, 50,000′ 2″ 4.5# EUE-LW Tubing, 20,000′ 2″ 3.75# Line Pipe. The above pipe all single random lengths, located in West Virginia area, and is subject to buyer's inspection and prior sale. Goodman Pipe Corp., Box 257, Bradford, Pa., Phone 4169.

FOR SALE: Wilson Mogul draw works powered by G.A.K. Waukesha engine. Good condition, priced for quick sale. Terms. Melton Supply Company, Seminole, Oklahoma.

MURPHY DIESEL, ME-66

Brand New—Sacrifice—At OEM's Cost 1163 cu. in., 6-cylinder, 188 HP, @ 1200 RPM. Never been used. 28% off list. Contact: Box C-613, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

IMMEDIATE DELIVERY

NEW PLAIN HOT ROLLED, ANNEALED MILD STEEL SHEETS

*Approx. 200 TONS—12 ga. x 36″ x 96″

NEW HOT ROLLED MILD STEEL PLATES

*Approx. 340 TONS—¼″ x 5′ x 15′ & 20′
CARBON = .12 max.

FABRIKANT
STEEL PRODUCTS, Inc.
50th Floor—Woolworth Bldg.
NEW YORK 7, N. Y. BEekman 3-3041
CABLE ADDRESS: FABKANT, NEW YORK
MEMBER Association of Steel Distributors

EQUIPMENT FOR SALE

FOR SALE: Oil Well Service Unit—Muskogee Model T Single Drum with Buda Model K428 Motor—Mounted on D-40 International Truck—45′ Telescope A Mast Ready for Work. ¾″ x 5000′ Line, ⅝ x 800′ Tubing Line, Few Tools, all for $3850.00. General Tool & Supply Co., P.O. Box 4387, Phone 6-1335, Oklahoma City, Okla.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6″ to 12″, excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W Sternberg, 8250 Wier Drive, Houston, Texas Phone Preston 7043.

FOR SALE: We have abandoned several gasoline plants in Oklahoma and have available, cheap, quantity such items as absorbers, centrifugal and steam pumps, gas and steam turbines, steam engines, closed type heater and cooling sections, cooling towers, horiz. engine compressor units. Catalog with prices listing such material available upon request. Cities Service Oil Company, Patridge, Bartlesville, Okla.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17′ Power Cylinders complete ready to run with 16″ to 18″ Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

FOR SALE

Three 8000′ capacity steam rigs complete with 129′ releg derricks and substructure, blowout preventers, drill pipe, and everything ready to put to work. Rigs located at or near Alice, Tex.

For further information, write

AL BUCHANAN DRILLING COMPANY
2114 Alamo National Bldg.,
San Antonio, Texas

or Frank Buchanan, c/o Al Buchanan Drilling Company, Box 1308, Alice, Texas

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

1—4,000′ POWER Rotary Drilling Rig complete with 87′ Moore Mast and Subbase. 2 EK Waukesha Motors with extension shafts (V-Belt), excellent condition. 6 x 16 Wilson Snyder Power Pump. 5 Drill Collars, Kelly, Etc. Will sell as one unit or separately. Phone 41213, Wichita, Kansas.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo.

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

For Sale Emsco Mud Pump

Exposed liner type, Model C-12, Serial 213, size 7¼ x 12.

Mounted on skids equipped with suction and hose and 48″ V-belt sheave.

Extra gaskets, valves, seats, heads, rods, and 1 set of 7¼ Emsco liner and 1 set of 6¾ Emsco liner.

Pump is in good condition and is up for your inspection in our yard at Great Bend, Kansas.

Crown Oil Company, Inc.
Great Bend, Kansas **Ph. 3571**

LINE PIPE

Fabricated

8⅝″, 10¾″, 12¾″ up to 36″ OD in 10 ga., ¼″, ¼″, ⅜″ and ⅜″ Wall

AVAILABLE NOW

H. J. LORENZ CO., INC.
448 So. Hill St.
Los Angeles 13, California
Phone: MUtual 4132

A RUGGED 7,500′ ROTARY RIG

VERY ATTRACTIVE PRICE

Powered by two **practically new** Le Roi 12-cylinder engines. 6700′ excellent 4½″ full hole drill pipe with drill collars. ● 18″ heavy duty slush pump. ● 300-ton hook and heavy blocks. ● Large swivel. ● 26″ oil bath rotary table. ● Vibrating shale shaker. ● Light plant. ● Butane tank. ● Tool house and tool box. ● Blowout preventer. ● Overshot. ● Casing tools. ● Complete accessories with many extras. Located in West Texas.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA OKLAHOMA

EQUIPMENT FOR SALE

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000′—Respooled for Your Inspection — Cable Tools For Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

AUTOMATIC WELDING MACHINE SPECIALS

2 Union melt units, 1,000 Amps Westinghouse transformer, Flux Arc Recovery Units. Many Extras. Lots new parts. Fraction New Price.

COLUMBIA SUPPLY COMPANY
911 E. Independence, Tulsa, Okla.

FOR SALE: Emsco G-350 Draw Works bought July 1, 1948. Powered with two D-13900 Cats, or I will keep motors and you can equip with any you desire; or I will sell complete rig with mast. Draw Works designed for three motors. Rig is better than new because it will cost less and is complete with everything needed on rotary drilling rig. Reason for selling, too much rig for work in this area. This equipment will stand inspection. C-691, The Oil and Gas Journal, Tulsa, Oklahoma.

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary chain pull down, smallest pump size 3½ x 5. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8800 Lemmon Ave., Dallas 9, Texas.

FOR SALE

20,000′ New J-55 5½″ OD, 15½# Seamless Oil Well Casing, 8 Rd. Thr., Long Coup., Range 2
25,000′ New J-55 5½″ OD, 17# Seamless Oil Well Casing, 8 Rd. Thr., Long Coup., Range 1
48,000′ New J-55 6⅝″ OD, 20# Seamless Oil Well Casing, 8 Rd. Thr., Long Coup., Range 2
15,000′ New J-55 7″ OD, 20# Seamless Oil Well Casing, 8 Rd. Thr., Long Coup., Range 2
14,000′ New J-55 7″ OD, 23# Seamless Oil Well Casing, 8 Rd. Thr., Long Coup., Range 2
50,000′ New J-55 2⅜″ OD Ext. Upset Tubing, 8 Rd. Thr., Range 2
Subject to Prior Sale
Inquiries Invited
We are also at all times in the market to buy material as described above

A. G. GHYSELS CO.
1209 No. State St., Chicago 10, Ill.
Superior 7-4412

1—60 HP, Clark Gas Engine, #4312, Direct Connected to 4¼ x 12 Superior, High Stage Compressor, good condition. Inquire, Purchasing Department, Johnson Oil Refining Co., Cleveland, Oklahoma.

FOR SALE: Star 83 Speedster Spudder, excellent condition; two WAK Waukesha Engines completely overhauled; one NK Waukesha engine complete with clutch. All priced to sell. Lesh Drilling Company, Box 305, St. Elmo, Illinois, telephone 261.

FOR SALE: Rotary rig, Wilson Giant draw works, 90 foot L. C. Moore mast, Wilson-Snyder 6x16 pump. Allis-Chalmers L-90 and International 110 H. P. motors. All tools and equipment complete except drill pipe located at Hobbs, New Mexico. Price $21,500.00 f.o.b. Hobbs. Address Donald Brown, Postoffice Box 1126, Roswell, New Mexico. Telephone 2973.

ONE portable rotary water well drilling rig, dual engines, now operating, good for one thousand feet. Box C-714, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPE

200,000′—2⅜″ Good Used Line Pipe
2″ 4 lb. Regular Tubing, steam cleaned
2½″ Upset Tubing
25,000′ Seamless 5½ O.D. Range 2 & 7″ O.D.

A. D. TAGGART—ASSOCIATES
309 Barr Hotel Bldg. Phone 309
Lima, Ohio

FOR SALE

6—Approx. 26,000 gallon steel storage tanks, 10′6″ dia. x 40′6″ overall, ⅜″ shell, ⅝″ flanged and dished heads, welded construction, hydrostatically tested to 75#.

ROGERS AND WRIGHT, INC.
710 Peoples Building (Phone 30-171)
Charleston, West Virginia

STEEL TANKS IN STOCK

2—74,000 BBL. LIKE NEW 114′ X 40′ TANKS ARE CLEAN — AT MORGANTOWN, W. VA.
1—5000 BBL. BOLTED AT NEW YORK
5—1000 BBL. & 4—100 BBL. BOLTED AT NEW YORK
DARIEN CORP., 60 E. 42ND. ST., NEW YORK 17, N. Y.

FOR SALE
LUFKIN PUMPING UNIT

Model TC-2-A-35 complete with #140 GKU Waukesha engine located in Houma, La. Used short time and in good condition. Price $3,700.00 F.O.B. Houma yard. For further particulars contact The Louisiana Land and Exploration Company, American Bank Building, New Orleans, La.

MARTIN DECKER Slim Hole Weight Indicators. Reconditioned. Guaranteed New—$300. Ours—$135. Columbia Supply Co., 911 E. Independence, Tulsa, Oklahoma.

CARDWELL Double drum Model RL spudder used only 6 months, excellent condition, complete with lines, tools, light plant, etc. Folk Drilling Co., Yukon, Okla.

FOR SALE: New 48″ x 30″ Triple Sheave Grooved for 1⅛″ Wire, McKissick Streamlined Traveling Block. Reduced price. Box C-712, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: 3—Used LeRoi 12-cyl. Model RXISV—300 HP Gas Engines with Twin Disc Clutches, complete. Good condition—reasonable price. The National Supply Company, Fort Worth, Texas.

BUDA GASOLINE POWER Unit, 164 HP, $1775.00; G.M.C 6-71 Diesel Power Unit, $2000.00. Write or Phone: Werzel Machinery Company, Harrison 0021, 2136 Jefferson Street, Kansas City, Missouri.

OIL WELL CASING

One or two strings, five and half inch J-55 seamless casing for sale by owner, immediate delivery. C. L. Dretzke, phone 2-5216 or room 203 Mayo building, Tulsa, Oklahoma.

1—5½ KEYSTONE (Joplin Special), A-1 condition, Electric Starting equipment. Butane Equipment, Kohler light plant, steel doghouse, good cordage and tools—8″-6″-5″. J. E. Jolly, Drilling Contractor, 305 North Seminary, Princeton, Indiana.

EQUIPMENT WANTED

WANTED: Used Cross Reaction Chamber. Approximately 5′ OD x 44′ long. State price, condition, location, enclose sketch. Box C-422, The Oil and Gas Journal, Tulsa, Oklahoma.

REAL ESTATE

AVAILABLE immediately, manufacturing facilities consisting of large processing tanks 300,000 gallon storage capacity, tank car handling, 10,000 square feet warehouse, two 125 H.P. gas fired boilers, RR siding, labor plentiful. Location, Wichita Falls, Texas. Write Box C-710, The Oil and Gas Journal, Tulsa, Oklahoma.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1906. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

HELP WANTED

ENGINEERING
POSITION
OPEN

The Grayburg Producers Committee is seeking a well qualified Petroleum Engineer to supervise gas injection operations in the North Cowden Field. An experienced engineer is needed to maintain statistical data and to act in an advisory capacity on the operation of this extensive program. This job should offer an excellent opportunity for a person interested in secondary recovery operations in the Permian Basin. Headquarters will be in Midland, Texas. Write

MR. TOM B. CAMPBELL
Chairman Grayburg Producers Committee
Box 1540, Midland, Texas

CAST IRON PIPE

Bell and Spigot Class 150 and 250

2,100 ft. 4 in.		
21,500 ft. 6 in.	14,250 ft. 10 in.	3,000 ft. 20 in.
16,280 ft. 8 in.	32,450 ft. 12 in.	11,000 ft. 24 in.

12 ft. and 18 ft. lengths

Immediate Delivery Any Quantity

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION

2nd and Riverview (X-377) Kansas City 18, Kansas
THatcher 9243

HELP WANTED

SUPERINTENDENT needed for new natural gasoline plant in northwestern New Mexico. Must be capable of inspecting construction work now in progress and training personnel. At least two years college training and prior supervisory experience necessary. Send details of experience and education to Southern Union Gas Company, 1104 Burt Building, Dallas 1, Texas.

WANTED: Geologist for supervisory and administrative duties exploration and drilling project Middle East. Should have some experience in seisimc and surface work. Age 30 to 45. Reply Box C-704, The Oil and Gas Journal, Tulsa, Oklahoma.

ROCKY MOUNTAIN AREA oil jobs our specialty. Petroleum engineers, geologists, chemists, surveyors, draftsmen, write for information. Professional Placement Service, 613 Mack Bldg., Denver, Colo.

WANTED: Accountant experienced in Refinery Property and Yield accounting. Give full details of training and experience in first letter. Write Box C-711, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIGNER

A nationally known valve manufacturer with several U. S. plants, supplying the oil and gas industry, has an excellent opening for an experienced valve designer. Must be thoroughly acquainted with valve industry and have creative ability. Good income, permanent and offers right man a responsible place. Give full particulars in first letter.

Box C-706

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

UNITED GEOPHYSICAL COMPANY, INC.

has openings in both North and South America and the Middle East for

Experienced Seismic
Party Chiefs
Seismologists
Computers
Observers
Drillers

595 East Colorado Street, Pasadena 1, California

RESEARCH POSITION

Investigation of fluid flow in petroleum reservoirs and associated problems. Training in Physical Chemistry or Petroleum Engineering with experience desirable. Position is permanent. Working conditions excellent. Location Western Pennsylvania with major oil company. Salary open. Write giving pertinent personal and technical data in first letter.

Box C-703

The Oil and Gas Journal,
Tulsa, Oklahoma

HELP WANTED

WE have an opening in our organization for a Sales Engineer who is a graduate Chemical Engineer or a graduate Petroleum Engineer with considerable refinery experience behind him. This is a splendid opportunity to eventually command a splendid salary. Salary will be based on training and experience. Write giving training, experience, and personal details to Allan Edwards, Inc., 505 McBirney Building, Tulsa, Oklahoma.

OIL Industry Employment Service, 319 Castle Bldg., Tulsa, Okla. Tom Robinson, Mgr. Phone 4-5974. No fees to pay. Needed in Persian Gulf area, Middle East. Division Pipeline Superintendent, salary open. Rotary drillers $565. Rotary derrickmen $495. Supervisory chefs $400. Oilfield welders $425. Write for details.

FIELD SALESMEN

For geophysical and core drill supplies. Locations Odessa and Wichita Falls. Salary and commission. Enclose photograph.

TRANS-AMERICAN SUPPLY CO., Inc.
4803-05 Lemmon Ave.
Dallas, Texas

FOREIGN EMPLOYMENT In SAUDI ARABIA

ENGINEERS

Maintenance: ME's, EE's, CE's
Power Engineers and Assistants
Process and Chemical Engineers

GEOLOGISTS

Surface Mapping
Sub-Surface
Economic

SENIOR PALEONTOLOGIST

SURVEYORS

Triangulation
Recorder-Triangulation
Precise Leveling

OPERATORS

Production, Gas Oil Separators, Topping Still, Natural Gasoline Plant and Auxiliary Power Plants

Career employment opportunities. Room and Board furnished. Paid vacation in U.S. after each 24-month period. Retirement plan and liberal benefits.

If interested, apply by letter giving complete employment and personal history.

ARABIAN AMERICAN OIL COMPANY
200 Bush Street **Dept. 'A'**
San Francisco, California

HELP WANTED

WANTED: Supervisor for refinery pump and engine maintenance. Applicant must have engineering training and experience. Good salary with house furnished at low rent. Box C-692, The Oil & Gas Journal, Tulsa, Oklahoma.

WANTED

For Houston and Gulf Coast Area, Man Qualified to head special Rotary Sales Department with Major Supply Company. Must have Engineering Degree. Give Age, Experience, Salary Requirements and References.

Box C-705

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

CHEMICAL ENGINEER

Exceptional opportunity offered engineer with experience in the fundamental design and operation of natural gas processing equipment. Primarily want person with ability and knowledge to direct and supervise engineering program and assist in sales. Letter of application should include photograph, personal data, record of education and experience, references, and expected salary range.

BOX C-695

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

PERSONNEL AND LABOR RELATIONS

Completely integrated oil company with approximately 1500 to 1700 employees has excellent opportunity to offer the right man—

Age—37 to 43 years.

Experience—Minimum of 5 years in Petroleum Industry in Personnel and Labor Relations, including actual experience in negotiating labor agreements.

Education—College, including some law.

Applicant must be Southern born or must have lived in the South for the past 10 years.

Salary—Commensurate with ability and experience.

Box C-698, The Oil and Gas Journal
Tulsa, Oklahoma

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

SITUATIONS WANTED

GEOPHYSICIST: Graduate Engineer with ten years seismograph experience as Party Chief and Supervisor over twelve state area desires position in seismic review or interpretation at permanent location. Presently employed as Supervisor of several seismograph crews. If interested, please give general information as to salary and position available. Box C-677, The Oil and Gas Journal, Tulsa, Oklahoma.

BSME—Oklahoma University. 2½ years diversified experience in Natural Gasoline and Refinery work, including Process, Office, Design, and Construction Engineering. Domestic and Foreign Service. Prefer Southwest. Box C-713, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

CRUDE OIL FOR SALE: 42°A.P.I., approximately 1500 barrels per month, possibly increasing to 15,000 per month in one year, handled by Interstate Pipe Line Carrier. Will sell to highest bidder (field price $2.65). Box C-694, The Oil and Gas Journal, Tulsa, Oklahoma.

ALUMINUM PAINT—200—6 gallon cans, Exterior Spar Varnish vehicle. Highly polished, Aluminum Paste pigment in separate container. Distributors Liquidation. Regular price $33.60—take any part, $12.00 per 6 gallon can. Send check with order. The National, 606 Walnut, Kansas City, Missouri.

MAILING LISTS

OPERATING Personnel Lists of Production, Refining, Natural Gasoline, Pipelines, Drilling, Supply Stores, etc. Guaranteed. Catalogue Free. Our 29th Year. Oil Industry Mailing List Co., Box 2603, Tulsa, Okla.

LEASE AND DRILLING BLOCKS

830-ACRE block, Osage County, Oklahoma. Near production with four sands 1600 to 2050'. Will farm out block to responsible operator who is financially able to drill several wells and develop block. Box C-652, The Oil and Gas Journal, Tulsa, Oklahoma.

TO LEASE for oil 640 acres Reagan County Texas 5 miles S. W. Styles 3 miles north University lands Quarter mile south Centerela on Middle Concher River at Big Rock. L. B. Dougal, 2001 Concourse, Bronx, New York.

PROSPECTIVE new shallow, high gravity oil field, N.W. Ga. Mississippian, Devonian, shale and limestone exposures. Good structural indications. Drilling deals considered. Dietzen, Rt. 3, St. Elmo, Tenn.

MUSH CREEK AREA—Weston County, Wyoming, 80 to 640 acre lease on Lodgepole structure, T. 44 N., R. 65 W.—$10 per acre. Details on request. R. G. Park, 539 Downing, Denver 3, Colo.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton (5), St. Louis, Missouri

PATENTS FOR SALE

SALE OF PETROLEUM PATENTS

Thirty-nine patents covering the "True Vapor Phase Process of petroleum cracking, with rights to certain by-products, must be sold. Expiration dates are as late as June 12, 1962. These patents are currently returning royalties. Address inquiries to:

WILLIAM DUFFY, JR.
Trustee for Petroleum Conversion Corporation
228 Delaware Trust Building
Wilmington, Delaware

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ROYALTIES IN HOT AREAS!
Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

WANTED: ROYALTIES AND PRODUCTION. We are buyers. Send full particulars. Immediate action. Gerber & Company, 120 Wall Street, New York.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 315-15th Street, N.W., Washington 5, D. C.

Equipment Men

(Continued from page 157)

Kans., as assistant district engineer, subsurface department, the position he leaves.

Harold C. Nicholson has been appointed manager of Oil Well's Natchez, Miss., store. A field representative at Houston since April, Nicholson succeeds George T. Way, who has transferred to Harvey, La., as store manager. Way has served as manager of stores at McPherson, Kans., and Okmulgee, Fairfax, and Seminole, Okla.

James A. Brunnemer has been named manager of the McPherson, Kans., store in the Mid-Continent division. Since 1947 Brunnemer has served as storeman in the Russell, Kans., store.

Walter Takes Houston Post, Patterson-Ballagh

F. O. WALTER

Jack Magoffin, Mid-Continent manager for Patterson-Ballagh division of Byron Jackson Co., has appointed F. O. Walter as manager of the Houston office. Walter was formerly in the purchasing department at Homco and has worked for Abercrombie. More recently he has been associated with the McCarty Oil & Gas Co.

McCarthy Interests Purchase Tube & Steel Co. Plant

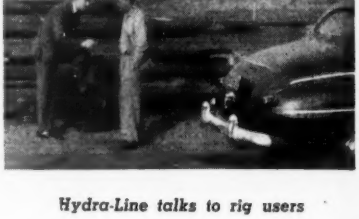
Glen McCarthy and International Rolling Mill Products Corp., Chicago, have purchased the 4,000-ton-a-month Dearborn plant of Detroit Tube & Steel Co., formerly a subsidiary of Sharon Steel Co., Detroit.

The plant will be operated by the McCarthy-International Tube Corp. and will make steel pipe from ½ to 5½-in. diameter. Officers of the concern are: McCarthy, president; L. D. Roberts, vice president; and G. M. McGranahan, vice president.

Three members of the six-man board of directors are Houstonians. They are Glen McCarthy; William J. McCarthy, his brother; and A. G. Mcneese, Jr. Present plans are to enlarge the plant to make larger-diameter pipe. Most of the output is expected to go to the oil industry.

Hydra-Line Survey to Determine Rig Design

Carl Engelmohr, sales-engineering manager, Hydra-Line division, Johnston Enterprises, and his assistants have completed a market survey in major producing areas except the Appalachian, to determine customer



Hydra-Line talks to rig users

preference for Hydra-Line rig design and service.

The following questions were asked in the survey: How many different models and designs should be made of drilling, servicing (rod and tubing) workover, pumping and pumping-pulling rigs? How many of each model would be required and in what order? Where a choice of components is possible, notably motive power, what makes are most in demand? The results of the survey will be used to determine Hydra-Line's design policy, production schedules, and locations of sales and service centers.

Columbia Chemical Makes Research Appointments

Appointments of Dr. Albert E. Sidwell, Jr., as assistant director of research, and Ralph F. Wolf as manager of compounding research for Columbia Chemical division of Pittsburgh Plate Glass Co. have been announced by Dr. Alphonse Pechukas, research director for the division.

Dr. Sidwell will direct the division's laboratory work in inorganic and analytical fields. Prior to joining Columbia Chemical, he had been associated with the American Medical Association for 10 years, first as a chemist and then as director of

Officials and salesmen attending 2-day Cameron Iron Works meeting

the association's laboratory. Previously, he had served for 4 years as a research instructor at University of Chicago.

Wolf joined the Columbia research department last January. He had served for 2 years as technical director of Standard Chemical Co., Akron, and has also been assistant factory manager for Polson Rubber Co.

Assistant director of research, Dr. Franklin Strain, will continue as administrative assistant to Dr. Pechukas, in addition to directing laboratory work in the field of organic chemistry.

Louis Ward Joins Spencer Chemical

Louis L. Ward has recently joined the sales staff of Spencer Chemical Co., Kansas City, Mo. Before employment by Spencer, Ward was with Sinclair Coal Co. He is a native of Kansas City.

Worthington Pump Changes Activities of Subsidiary

Worthington Pump & Machinery Corp. has announced that the manufacturing and distributing activities of its subsidiary, Ransome Machinery Co., will be conducted by the parent corporation.

Manufacturing operations for the lines previously manufactured by Ransome will be carried on at Worthington's Dunellen Works, Dunellen, N. J., the same location formerly used by Ransome Machinery Co. Sales activities will be directed from Worthington's executive offices at Harrison, N. J., through the Ransome sales division located at the Dunellen Works.

Cameron Iron Salesmen Attend Houston Meeting

The Cameron Iron Works sales staff recently met at the Cameron plant in Houston for a 2-day session.

Past accomplishments and plans for the future were reviewed by E. L. Lorehn, vice president and general manager. Salesmen were also introduced to the new Cameron line of forged steel well heads and the new Cameron Flo-Seal gate-plug valves designed for general oil-field and refinery service. An informal dinner party for the salesmen and their wives was held at Ye Old College Inn.

Those attending were: (front row) Roy Davis, Jeff Musolf, R. F. Farmer, E. L. Lorehn, H. Allen, I. M. Baker, F. H. Isaacks. (First row standing): A. L. Scharck, Gene L. Teer, J. P. Wood, W. I. Sykes, R. W. Gustine, D. W. Townsend, I. E. Moses, X. R. Showers, Homer E. Brown, Joe Tennant. (Second row standing): J. B. Ray, M. L. Hooks, G. L. Duwe, Geo. Myers, J. R. Jerabeck, D. V. Clemons, S. S. Raimer. (Third row standing): A. A. O'Connor, J. A. Collet, C. Potts, Frank Graham, H. A. Calvert, R. G. Branch, Morey Zorgdrager.

Timken Detroit Axle Advances Hays and Mitchell

ROBERT M. HAYS

R. H. Trese, vice president, Timken-Detroit Axle Co., announces the appointment of Robert M. Hays to the position of sales manager of the Trailer Axle division. Hays has been a member of the Timken Axle sales department for several years. K. J. Mitchell has been appointed assistant sales manager of the division.

Kelley Takes Post With Patterson Foundry Machine

Joseph W. Kelley has been appointed division sales manager of the special equipment division of Patterson Foundry & Machine Co., East Liverpool, Ohio. He will be in charge of the sale of specially designed chemical and process apparatus. Kelley was formerly assistant sales manager of Goslin-Birmingham Co., Birmingham, Ala. His headquarters will be East Liverpool.

Simpson Succeeds Wear At Harrisburg Steel

The board of directors, Harrisburg Steel Corp., has announced the resignation of Wilbert Wear as president of the corporation. He will remain with the corporation in a consulting capacity.

Joseph T. Simpson was elected president to succeed Wear. H. M. Reeser was elected vice president and secretary, D. M. Horner vice president, E. L. Martin assistant treasurer, and C. M. March assistant secretary. W. H. Troyer continues as treasurer of the corporation. J. H. Whitmeyer was named general superintendent. Reeser will be in charge of sales and Horner in charge of operations.

Brennan Is Sales Engineer For Fluid Packed Pumps

Sidney Shuman, general sales manager of Fluid Packed Pump Co., announces the appointment of John R. Brennan as sales departmental engineer. For 12 years Brennan has been with Union Oil Co. as field engineer and production foreman. He will headquarter in California.

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CALENDAR

1949

January

Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich., January 10-14.

February

American Institute of Mining and Metallurgical Engineers, annual meeting, Fairmont Hotel, San Francisco, February 13-17.

American Society for Testing Materials, spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

American Petroleum Institute, Southwestern district, Galvez Hotel, Galveston, Tex., March 9-11.

American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa, March 23-25.

New England Gas Association, Hotel Statler, Boston, March 24-25.

Western Petroleum Refiners Association thirty-seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting, San Francisco, March 27-April 1.

April

American Petroleum Institute, Division of Refining, mid-year meeting, Shamrock Hotel, Houston, April 4-7.

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel, New York, April 11-13.

National Association of Corrosion Engineers, annual convention, Netherlands Plaza Hotel, April 11-14, Cincinnati, Ohio.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss., April 20-22.

American Petroleum Institute, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 27-29.

May

Independent Petroleum Association of America, mid-year directors meeting, New Orleans, La., May 2-4.

American Gas Association, natural-gas department, spring meeting, French Lick Springs Hotel, French Lick, Ind., May 9-10.

American Petroleum Institute, division of production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles, Calif., May 12-13.

American Petroleum Institute, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., May 26-27.

June

American Society for Testing Materials, fifty-second annual meeting, Hotel Chalfonte Haddon Hall, Atlantic City, N. J., June 27-July 1.

NOMADS

Houston Nomads, second Monday of each month, The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D.C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (b) and (c). The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The land is offered in one parcel described as the NW¼NW¼ sec. 24, T. 20 S., R. 28 E., N.M.P.M., New Mexico, 40 acres, and is within the known geologic structure of the Russell field. Bids must be submitted on or before 1 p.m., December 22, 1948. Marion Clawson, Director.

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